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A serial queuing model for the Navy Advanced Traceability and Control (ATAC) system

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THESIS

A SERIAL QUEUING MODEL OF
THE NAVY ADVANCED TRACEABILITY
AND CONTROL (ATAC) SYSTEM

by

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and
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A Serial Queuing Model of the Navy Advanced Traceability and Control (ATAC) System

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ABSTRACT

The purpose of this thesis was to develop a preliminary simulation model of the Advanced Traceability and Control (ATAC) process. The motivation was the need to evaluate significant policy decisions such as, Defense Management Review Decision (DMRD) 901's "ship or hold" decision. An analysis of the operation of ATAC and the data base maintained by Navy Material Transportation Office (NAVMTO) were made to provide necessary details for constructing the model. Significant data base problems were discovered that precluded the development of an elaborate simulation model. Although the simulation model is very simple, it does show that more detailed and accurate ATAC data are needed to effectively measure and monitor the ATAC system.

TABLE OF CONTENTS

I. INTRODUCTION

A. BACKGROUND

Since the Advanced Traceability and Control (ATAC) system was tested in 1985 and implemented in 1986, failed Navy items which are Depot Level Repairables (DLRs) have been directed to be processed through ATAC HUBs before being sent to storage at Designated Support Points (DSPs) or to repair at Designated Overhaul Points (DOPs). The functions of these HUBs are to receive, screen and identify, package and preserve, and transship or stow these "retrograde" DLRs. The purpose of the ATAC HUB system is to reduce the repairable parts pipeline while, at the same time, ensuring the accountability and visibility of the retrograde material. In addition, the system achieves transportation savings through the consolidation of shipments from the HUBs, as well as labor and processing cost reductions from the consolidation of labor resources and modernization of processing capabilities at the HUBs.

The Department of Defense has sought, in a series of recent Defense Management Review Decisions (DMRDs), to improve the economy and efficiency of logistical support within the military. One particular section of DMRD 901 addresses changing the current Navy process of returning retrograde

material to DOPs. The current policy for processing the majority of failed DLRs is to incorporate the scheduling for induction in advance into a mechanized Master Repairables Item List (MRIL) so that the ATAC HUB can immediately know to ship these "workload" scheduled parts to the DOP for induction.

DMRD 901 states that transportation dollar savings would be significant if all failed DLRs would be held at the first point that fleet activity users turn them in to the supply system [Ref. 1]. The intent is to limit shipment of material to those DLRs that have immediate need for repair. Implicit in the DMRD argument is the assumption that most not-ready-for-issue (NRFI) DLRs will never need to be repaired and, if stored at their turn-in point, savings in transportation costs will result.

From the authors' initial telephone conversation with Captain Gianfagna at NAVSUP Code 0129 [Ref. 2] it was learned that NAVSUP had successfully argued against the DMRD 901 proposal to hold all DLR retrograde at the first point of turn-in. One position that NAVSUP took in response to DMRD 901 was that the Navy might hold at the point of turn-in all repairable items not expected to experience a demand within 2.5 years [Ref. 3]. For all other items, the retrograde would be processed by the HUBs and sent on to the DSP/DOP. As this 2.5 year value was somewhat arbitrary [Ref. 3], a model of the process could provide a more justifiable value. An average cost flow analysis of the proposed DMRD 901 changes was done

by Mr. Kevin Fitzpatrick of NAVSUP Code 0631. [Ref. 4] Fitzpatrick presents a linear break-even model that incorporates the average number of carcasses flowing through the ATAC system and the total annual costs associated with both the current ATAC process and the process under DMRD 901. The effect on total costs of varying possible redistribution rates under DMRD 901 was calculated by varying the number of carcasses shipped from the HUBS to the DOPs/DSPs. The conclusion presented was that it is not economical to delay shipping carcasses from the HUBs as long as at least 30% of these carcasses will require immediate redistribution. It should be noted, however, that this analysis did not consider the stochastic nature of the failure and carcass return process for repairable items.

Various problems associated with DMRD 901 were also presented in this analysis:

1. The inability of ATAC HUBs to create additional storage space to accommodate the increased storage requirements of DMRD 901.

2. Increased pipeline requirements while awaiting repair decisions and redistributions.

3. Increased labor costs at the HUBs greater than possible transportation cost savings.

4. Accountability and control problems with material in-transit.

An initial investigation by Professor McMasters of the Administrative Sciences Department at the Naval Postgraduate

School was reported in the thesis of Munson and Harris [Ref. 5;p. 40-42]. Under the assumption of Poisson arrivals and constant service time (i.e., exponentially distributed service times), McMasters showed how queuing theory can explain why stockpiles of carcasses can quickly build up at DOPs/DSPs and HUBs. The importance of an understanding of the relationship between arrival rates and service rates in the making of decisions was illustrated regarding workload rates at depots and processing rates through HUBs.

Captain Tully, NAVSUP Code 06 during 1990, also realized that an average flow model would not reflect the seriousness of the inventory storage problem at the HUBs. In addition, he knew that a stronger justification for the 2.5 years dividing line between carcasses shipped onward and those retained would eventually be needed. He asked Professor McMasters to look at the ATAC system as a stochastic process. [Ref. 3]

This thesis is a consequence of research proposed by McMasters to NAVSUP [Ref. 3]. McMasters suggested three possible levels of effort which could be undertaken to develop a model for the analysis of the carcass return process. Level I involves building an aggregated model of the Navy carcass return system, with an average type carcass reflecting average characteristics of repairables in the Navy system. The carcass routing would be quite simplified. Carcass arrivals would be assumed to be Poisson distributed and service times would be assumed to be constant or follow the exponential

distribution. The result would be a simple steady-state cyclic queuing model or a simple simulation model which could be used to determine which parameters are most important to decisions about shipping immediately or waiting until a repair requirement is generated.

Level II involves the determination of realistic probability distributions for demand, repair time, processing and transportation times to apply to the average type of carcass and simplified carcass routing model of Level I.

Level III proposes a much more elaborate model, involving a detailed realistic simulation model of the ATAC system that would provide answers to many different policy questions. This model would reflect a detailed understanding of each stage in the process and would incorporate real-world probability distributions for those stages characterized by random times. All of the costs (including transportation, storage, receipt and issue, disposal, holding, administrative repair order, and depot repair costs) and decision variables (such as carcass return routing, storage at each location, shipment consolidation, disposal decisions and repair induction control rules) would be incorporated in the model. The goal would be to develop a comprehensive processing policy for each repairable item.

B. OBJECTIVE

The objective of this thesis is to develop a simple simulation model which could be used to determine which parameters are most important to decisions about shipping an average carcass immediately to a DSP/DOP or waiting until a repair requirement is generated.

C. RESEARCH QUESTIONS

The following specific questions were developed to guide our research efforts to meet the thesis objective:

1. Can a simulation model of the ATAC system be developed?

2. Is there accurate and detailed data available that can be used in such a model? This is necessary to be able to accurately determine the average characteristics of a carcass and realistic probability distributions for demand, repair time, processing and transportation times. With very detailed and accurate data one can develop alternative processing priorities for individual items.

3. What are the ATAC operating procedures and what problems exist? A description of the ATAC operation is needed in order to establish the basis upon which the simulation model is built.

D. ORGANIZATION OF THE THESIS

Chapter II gives an overview of the ATAC process based on the authors' visit to the San Diego ATAC HUB, telephone interviews, and previous studies of the process [Refs. 5&6].

Chapter III provides an interpretation of the ATAC data collected for the thesis and discusses problems encountered with ATAC system process data and reports.

Chapter IV is a presentation of a simulation model of the ATAC carcass return process.

Chapter V presents a summary of the thesis, conclusions drawn from the research, and recommendations for further research.

Appendix A discusses problems discovered in using the ATAC Performance reports.

Appendix B presents examples of each of the monthly ATAC Performance reports used in our simulation model.

Appendix C consolidates the monthly reports for each separate category into one report covering the entire period. Then, all the reports are consolidated to represent system totals for the entire period.

II. THE ATAC SYSTEM

Before developing a model of a complex process one must understand how the process works. This chapter provides a description of the movement and positioning of DLR carcasses under the current ATAC system. This description of the ATAC system will form the basis of our simulation model. Information regarding HUB operations derives from the authors' visits to the San Diego HUB site.

The purpose of the ATAC system is to:

1. Reduce the repairable parts pipeline by providing for faster movement of Not-Ready-For-Issue (NRFI) DLRs being returned for repair.

2. Ensure accountability and visibility of all returned NRFI components.

3. Reduce transportation costs through consolidation of shipments from NODEs and HUBs.

4. Consolidate and reduce labor resources controlled by NAVSUP through economies of scale attained at the HUBs.

5. Minimize the cost of processing by developing "centers of excellence" at the two HUBs. [Ref. 4;p. 3]

Overall, the ATAC system combines commercial freight agent functions and a centralized Navy DLR technical screening process with the ability to trace and move repairable carcasses. A simple outline of the flow of repairable carcasses in the ATAC system is:

1. A Naval activity experiences a failure in a repairable component that cannot be fixed locally.

2. The activity turns the failed part over to the local supply activity that acts as a NODE.

3. The NODE ships the failed part to the closest HUB.

4. The HUB verifies the identity of the material, ascertains its disposition, and provides for its shipment to a DOP for repair, or to a DSP for storage until called for by the DOP at a later date.

The flow of repairable carcasses often does not go through a NODE. These are called "free flow" DLRs. In the case of "free flow" DLRs:

1. The originating activity sends the failed components directly to the nearest HUB via certified mail, or delivers it directly if located in the vicinity of a HUB.

2. The HUB verifies the material, ascertains its disposition and provides for its shipment to a DOP for repair, or to a DSP for storage.

Throughout the ATAC process, each unit of material is handled on a first-in, first-out basis and all items are treated alike. Such criteria as urgency of need or cost are not applied to create a priority scheme for deciding which units are to be handled first.

A. NODES

The first point of receipt for the material after it leaves the originating activity is a NODE (unless the originator is a deployed ship that has turned the part over to

a Combat Logistics Force (CLF) ship for further transfer to a NODE or, as previously mentioned, the activity uses certified mail or delivers it directly to a HUB). NODEs are basically transportation consolidation points, forwarding consolidated freight to the closest HUB for processing.

NODEs are the point at which management information on the NRFI component being turned in starts to get recorded in a Navy Regional Data Automation Center (NARDAC) managed ATAC data base. At this point just the document number and National Stock Number (NSN) of the NRFI component to be processed are entered into this ATAC data base.

NODES are also the initial point at which bar coded labels are attached to assets in the ATAC system. At this point just the NSN and document number are entered on the label.

NAVSUP has established eleven contractor-operated NODEs at selected high volume sites. These sites are: Charleston, SC; Jacksonville, FL; Pensacola, FL; Corpus Christi, TX; Bremerton, WA; Oakland, CA; Long Beach, CA; Cherry Point, NC; Sigonella, Sicily; Pearl Harbor, HI; Yokosuka, JA.

B. HUBS

There are three HUBS: Norfolk, VA; San Diego, CA; and Subic Bay, PI. Subic Bay is somewhat unique as a HUB. Subic Bay ships all DLRs to San Diego as bulk freight. No CONUS HUB processes Subic's DLRs. All Subic's DLRs are processed through NSC San Diego Central Receiving. Central Receiving

turns over any of Subic's DLRs requiring further shipment to the shipping agent. Those DLRs to be stowed at San Diego are routed to the Material Department for stowing. Material arriving at a HUB goes through a multi-step process:

1. receiving
2. screening
3. processing
4. packing
5. shipping

Step 1, receiving, is done by a contractor. Steps 2 through 4 are done by Navy HUB personnel. Step 5, shipping, is then done by another contractor.

Incoming material is received by an ATAC freight agent (currently Morrison-Knudsen Services Inc. (MKSI)); turned over to Navy HUB personnel for screening, Master Repairable Item List (MRIL) processing, and packing; and then turned back over to MKSI for consolidation before shipment by the designated Guaranteed Traffic Award (GTA) carrier (currently Pilot Air Freight Company), who moves the cargo by air and truck transport.

1. Receiving

The initial step in the HUB process starts when the contractor at the HUB receives a shipment from a NODE or directly from a Naval activity through regular mail. At this

point an initial visual screen of the material takes place to determine if the material is a DLR and if the material is hazardous but not labeled as such. In addition, a quick review of the material's documentation is done for ATAC excluded material (items not appropriate for ATAC system handling due to economics, safety, and security) [Ref. 5:p. 52]. These excluded items are immediately turned over to the Navy personnel at the HUB. The following items are excluded items:

1. Aircraft engines
2. Marine Gas Turbine Engines (Shipboard Propulsion Units)
3. Fleet Ballistic Missile Components
4. Classified Items
5. Redistributed Assets
6. Nuclear Reactor Plant Material
7. RADIAC Material
8. Class A, B, and C explosives
9. Small Arms, Ammunition and Night Vision Devices
10. Uncertified and improperly prepared hazardous material
11. Helicopter Gear Boxes
12. Oversized items which cannot be loaded into an enclosed-40 foot van by a single equipment operator with an 8,000 lb. forklift. [Ref. 5:p. 52]

Once again, as at the NODEs, the document number and NSN of non-excluded items are entered into the ATAC data base. This is done to allow management the capability to determine

if any carcasses failed to arrive at the HUB after being recorded as having been shipped from a NODE. It also allows for the calculation of transportation times to the HUB and provides a starting point for calculating the time spent in the HUB.

Each piece of material is then screened to determine if it has the required bar coded label attached. Those items received from NODES should already have a label attached. This label must contain the document number and NSN. If this label is missing, one will be created and applied.

To prepare the material for the next step in the HUB process, a manifest is prepared which lists the material and shows its location by pallet or portable bin. Each manifest includes multiple items so that the process at this point is a batch process. The simulation model as presented in Chapter IV, however, assumes just a serial process. The material, along with the manifest, is then turned over to Navy representatives at the HUB facility for the next step in the process.

2. Screening

When the transfer of custody of the material to Navy HUB personnel takes place, the event is entered into the ATAC data base and the material is sent to a Parts Master work station. The bar-coded NSN on the material is scanned into the Parts Master data base to produce data and management

information pertaining to each part. A printout of the Parts Master information is attached to the material to assist the screeners during the next step in the process. The screening function attempts to ensure that the actual physical component received is correctly identified and documented. The Parts Master printout of the part number for the item is compared to the part number physically inscribed on the part. If there is no match, or if there is no part number inscribed on the item, further technical research is done using additional technical microfiche and publications such as the aircraft Illustrated Parts Breakdown (IPBs). If the part cannot be identified, or if it can be identified but the documentation is wrong, a Report of Discrepancy (ROD) is generated and is sent to the original activity that sent the part to identify and prevent additional discrepancies, and to the ICP performing the carcass tracking.

3. Processing

After screening the material, disposition must be determined and a shipping or stowage document must be created. This is accomplished by the use of a mechanized MRIL which contains pertinent disposition information for each NSN, such as the Material Control Code, Movement Priority Designator, special shipping/handling requirements, and the shipping address. The information in the MRIL is updated monthly by

the Fleet Material Support Office (FMSO) based on information provided by the item managers at the ICPs.

The MRIL operator uses the bar coded labels to scan each part's NSN into the MRIL program. A DD Form 1348-1 shipping document or a local stowage/disposal document will then be produced automatically (except for transfers to activities participating in the Advanced Shipping program).

Advance Shipping is unique to Navy activities using the Uniformed Automated Data Processing System - Stock Point (UADPS-SP). Under this system, rather than a 1348-1 shipping document, a Material Movement Document (MMD) is attached to the item. This MMD indicates the shipping address and the specific warehouse and storage location at the receiving activity. All the Navy DSPs are participants in this program.

4. Packing

At this point the material is moved to a packing station where it is prepared for shipment or for local stowage or disposal. Material going to local stowage or disposal will be sent directly to stowage or disposal from the packing area. Material to be transshipped to another destination will be appropriately packaged for shipment with the shipment label attached.

5. Shipping

Material to be shipped to a DOP/DSP will be given to the contractor for consolidation and preparation for shipment. The steps in this shipping process are:

1. Record the transfer of custody of the material from the Navy to the contractor in the ATAC data base.

2. Consolidate the material for each destination. This is essentially a batch queuing process. The simulation model presented in Chapter IV assumes serial queuing.

3. Produce a bar-code shipping label containing the lead Transportation Control Number (TCN), number of pieces, weight, and destination. This label is then attached to the consolidated container.

4. The ATAC contractor turns the material over to the GTA carrier for the actual shipment.

5. The GTA carrier delivers the material to the central receiving area of the DOP. Under the Advanced Shipping program, the item will bypass a DSP's central receiving area and be delivered directly to the specified warehouse.

III. THE DATA

Many questions concerning the accuracy of the data used to support the simulation model mentioned in Chapter I surfaced during this research. Several of these questions will be discussed in this chapter.

The history concerning the collection of the data is important. The ATAC system was introduced in 1985 [Ref. 6;p 3]. The contractor was required to maintain the data base, which was designed to track DLR carcasses through the ATAC system, until it was substantial enough to warrant transfer of the data base responsibility to the Navy. By early 1989, the Navy made the decision to transfer the ATAC data base responsibility from the contractor to the Navy. The contract to transfer the data base took effect in January 1990.

Although the Naval Telecommunications Area Master Station Atlantic (NCTAMS LANT) actually manages the computer hardware used to maintain the ATAC data base, the Navy Material Transportation Office (NAVMTO) is the Navy activity responsible for it. However, only one supply analyst at NAVMTO is assigned to maintain this very large and complex data system. He is Paul Barraco, Code 033B. Paul is the person who must extract the data required to measure ATAC performance and present this data in ATAC Performance reports

to NAVSUP. Paul has made improvements to the accuracy of the data being entered over the past two years. However, there are still some problems to consider.

Our quest for accurate data on which to base our simulation led us to two separate data sources. The first was a computer tape of pre-1990 ATAC data. The second was a set of ATAC Performance reports from September 1990 through August 1991 (unfortunately the October 1990 report was missing). Accuracy problems concerning the computer tape are discussed in this chapter. The ATAC Performance Reports will also be discussed and some of the data will be graphically displayed (representing DLR receipts and processing over a specified period of time). The reports used are the latest and, according to Paul, the most accurate available. However, the reports have discrepancies which are discussed in Appendix A.

A. ATAC DATA BASE 1985-1989

Our initial research lead us to Paul Barraco, Code 033B, NAVMTO via Mike Beliveau, Code 0351, SPCC. We asked Mr. Barraco to provide us with a computer tape of the ATAC data base for the years 1982-1989. He informed us that he could not provide information for the years 1982 to 1984 since ATAC really did not go into effect until 1985. We received a tape called the Inventory Control Points Tape on 22 August 1991 which we expected would represent the entire ATAC data base from 1985 through 1989. As it turned out, the data consisted

only of the "open" records for that period. Open records are those that indicate DLRs were processed into the ATAC data system, but do not show that they have been processed to stow or repair. As we later discovered, the "closed" records are kept on microfiche. We had not requested a copy of the microfiche.

A copy of the Record Content Sheet (RCS) for the Inventory Control Points Tape is provided as Attachment A to Appendix A. It describes each data field of each record on the data base tape. Each record consists of 786 record positions. Problems were discovered when we examined the tape. Some of the more serious ones are listed below:

1. Although there were 153,244 open records on the tape, the majority of them were for items arriving in 1989.

2. Many records had a blank HUB field. This field should contain the Unit Identification Code (UIC) of the HUB receiving the item.

3. For many records, the NIIN field was either blank, zero-filled, or contained alpha/numeric symbols other than temporary stock numbers (e.g. NNNNNNNNN, //HARUN//, //07342//, ANNNNNNNN, etc.). Temporary NIINs are assigned to new stock items that are being used in the Navy supply system, but have not yet been assigned permanent NIINs (normally these NIINs begin with LL).

4. Many items processed through NODEs indicated HUB tailgate dates that preceded the initial turn-in date at the NODE. The HUB tailgate date represents the first day of processing at the HUB. This indicates the item arrived at the HUB before it was ever shipped from the NODE. It appears that either the HUB personnel did not know what this field was used for or just did not follow the procedures for entering the date into the data base during initial processing, or there was a software problem that caused the wrong dates to be entered.

5. Many shipping dates from the NODEs preceded NODE receipt dates or they were zero-filled. This again appears as a lack of training or proper care at the NODEs.

6. The field for the date on which the material was off-loaded at the HUB was blank for all records.

7. The field for the date the carrier picked up the material at the HUB for transhipment to the DOP/DSP was blank for all records.

8. The DOP/DSP field was blank for the majority of shipped SPCC cognizance DLRs (7H Cog). This field should contain the UIC of the DOP/DSP the item is shipped to.

9. The field for the arrival date at DOP/DSP was blank for all records. This date is used to represent Proof of Delivery (POD).

10. The field for piece (number of items shipped per shipping container), weight (of the container shipped) and cube (size of the container in cubic feet) was either zero-filled or was blank.

None of the records on this tape were complete. Due to the discrepancies found in the data tape, we were unable to obtain sufficient data to support a realistic ATAC system model.

Because of these problems, we also questioned the accuracy of the 1989 data used by NAVSUP to calculate average processing and shipping times provided in Reference 4. (Interestingly, NAVMTO, Code 033 was not familiar with the NAVSUP memo [Ref. 4]). The 1989 ATAC information was requested from the contractor by NAVMTO since the contractor had responsibility for the data base at that time.

We concluded that it would be virtually impossible to verify the NAVSUP processing times and we were reluctant to

accept them at face value for input into our model. However, for comparison purposes, computer simulations were run using the NAVSUP data provided in reference 4.

Because these data sources were inadequate, our pursuit for reliable data turned to another source.

B. ATAC PERFORMANCE REPORTS

Mr. Dave Estep, NAVSUP, Code 0631A told us about a set of reports generated for NAVSUP by NAVMTO from the ATAC data base. These reports are appropriately called the 'SUP' reports. We requested and received copies of the most recent reports. Most of the report packages consisted of the following:

1. Report M6, Monthly ATAC HUB Performance
2. Report M6A, Monthly East Coast CONUS NODE Performance
3. Report M6B, Monthly West Coast CONUS NODE Performance
4. Report M6C, Monthly Overseas NODE Performance
5. Report M6D, Monthly Overseas HUB Performance
6. Report M6E, Monthly CONUS HUB Performance

The reports provided were for September 1990, and November 1990 through August 1991. No October 1990 report was generated because of a data base problem during that month. These report packages changed over time. The September 1990 report package consisted only of reports M6, M6A and M6B. The report packages for November 1990 through February 1991 also included report M6C. The March through August 1991 packages included all of the reports listed above. Our analyses used the March through August 1991 reports. Examples of these reports are provided in Appendix B. Consolidated HUB and NODE reports are included in Appendix C covering the period March through August. First, each category of monthly reports (except M6D) are consolidated for each HUB and the East and West Coast NODEs to show total ATAC activity on each coast. Then, these consolidated reports are further combined to represent total ATAC system activity for the period of March through August 1991 for reports M6, M6A, M6B, M6C, and M6E.

C. ANALYSIS OF ATAC PERFORMANCE REPORTS

1. M6 Report [APP C; COMBINED]

a. Average Screen Time to DOP/DSP

Average screen time to DOP/DSP is defined to be the total time a DLR takes from the time it is turned over to the government HUB personnel for screening until the DLR is turned over to the ATAC agent for shipment. Average screen time during the period March through August 1991 was 4 days. This

implies the HUBs are currently taking two days longer than the NAVSUP 1989 average for screening and packing the material prior to turning it over to the agent for shipping to a DOP/DSP [Ref. 4]. This could mean the DLRs currently flowing through the HUB are not easily identified and/or require extra packing, which increases handling by HUB personnel. Or, there may have been a reduction in HUB personnel.

b. Average Screen Time For Stow

Average screen time for stow is defined to be the total time from the time a DLR is turned over to the government HUB personnel for screening until the DLR is stowed at the co-located DSP. Average screen time for the period March through August 1991 was 3 days. This is consistent with the NAVSUP 1989 average for processing time required to screen, pack and stow at the local DSP [Ref. 4].

2. M6E Report [APP C; COMBINED]

a. DLRs Received

Figure 3.1 shows the DLR receipts for Norfolk between March and August 1991. Norfolk had a significant decline in DLR receipts, from 35099 in March, to a low of 21859 in July. DLR receipts increased to 26952 in August. The monthly average number of DLRs received was 28028. The monthly average "free flow" was 20818. ("Free Flow" DLRs are those DLRs that arrive at the HUB without being processed through a NODE).

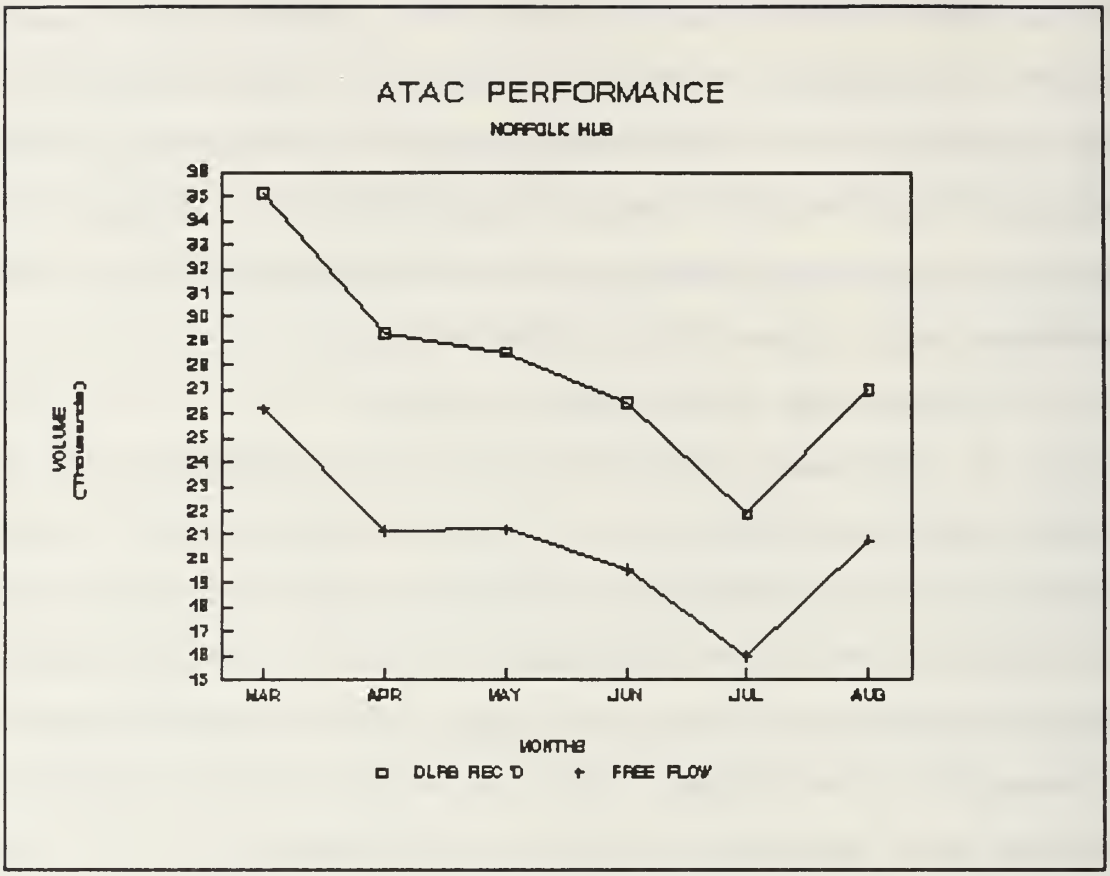

Figure 3.1. DLRs Received - Norfolk

Figure 3.2 shows the DLR receipts between March and August 1991 for San Diego. San Diego's business was the opposite of Norfolk's. San Diego's receipt increase may have been caused by Desert Shield/Storm. There was a significant increase in DLR receipts at San Diego over the entire period. San Diego's monthly average was 20444 for DLR receipts. The free flow monthly average was 20818. Receipts increased from 18420 in March to 23134 in August 1991.

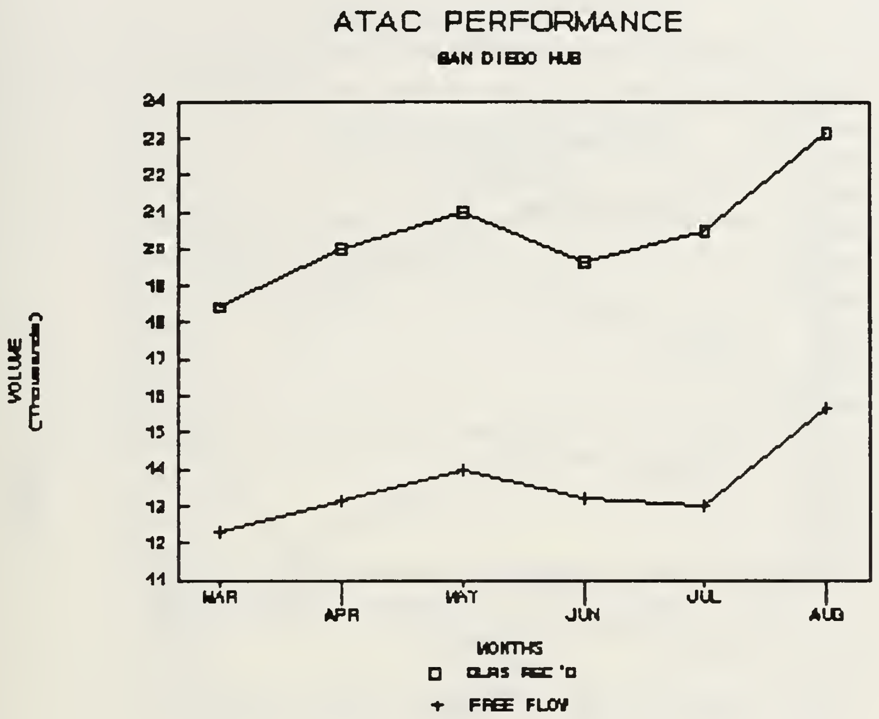

Figure 3.2. DLRs Received - San Diego

Figure 3.3 shows the combined result. Since Norfolk's volume was greater than San Diego's, there was a decline in both total and free flow DLR receipts. The combined total DLR receipts monthly average was 48472 and the free flow monthly average was 34364. The Desert Shield/Storm buildup appears to have affected the entire system in July of 1991, when the majority of DLR receipts reached their lowest point for the period.

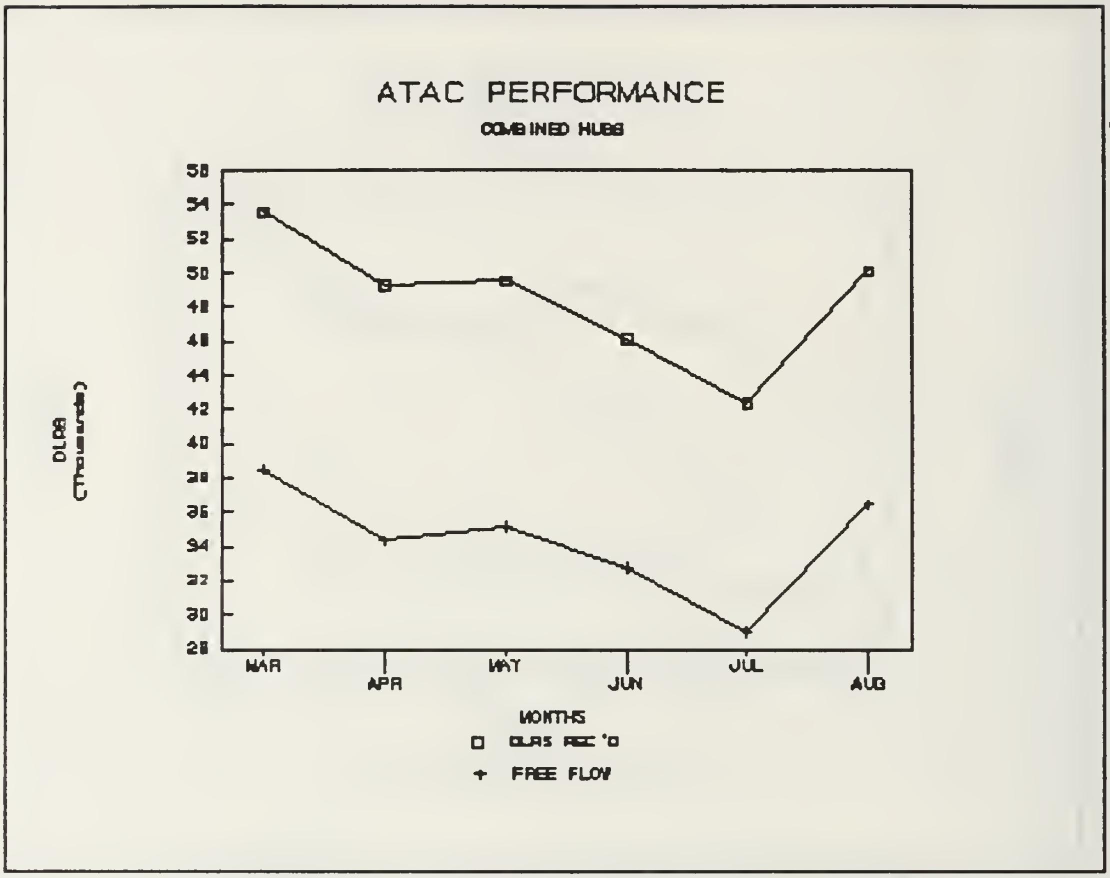

Figure 3.3. DLRs Received - Combined

b. DLRs Shipped or Stowed

Figure 3.4 shows the number of DLRs shipped or stowed by the Norfolk HUB. Norfolk maintained a relatively steady processing rate. The increase in DLRs shipped offset the decline in DLRs stowed. Norfolk's monthly average of DLRs processed was 26403. Of that, the monthly average shipped was 18348, and the monthly average stowed was 8055. The average monthly processing rate of 26403 was less than the average

number of 28028 received. This suggests there must have been a large backlog of receipts.

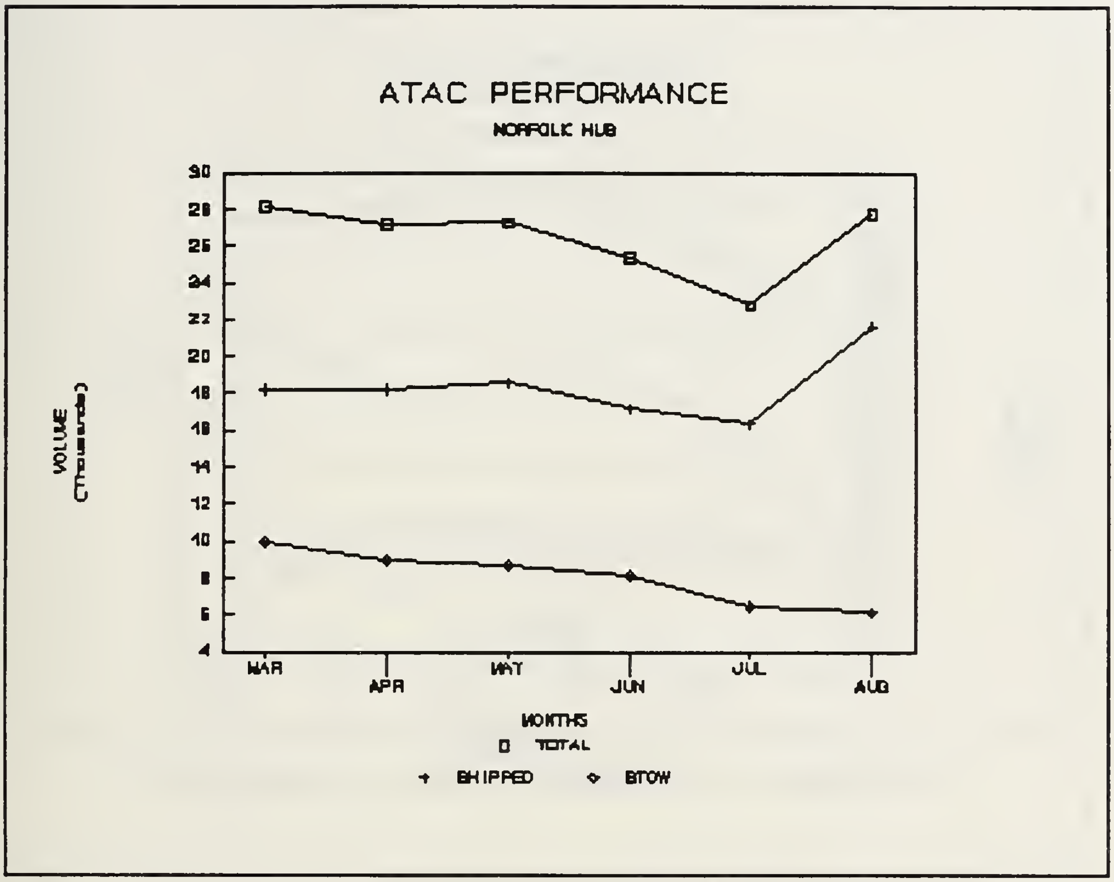

Figure 3.4. DLRs Processed - Norfolk

Figure 3.5 shows that San Diego initially increased its total number of DLRs processed. This was a consequence of the receipts shown in Figure 3.2. The increase in DLRs shipped was offset by the decrease in DLRs stowed. San Diego's monthly average of total DLRs processed was 20890. Of that amount, the monthly average shipped was 14249 and the monthly average stowed was 6641. It is interesting to note

that San Diego's monthly processing average of 20890 was quite close to the average number of receipts, 20444.

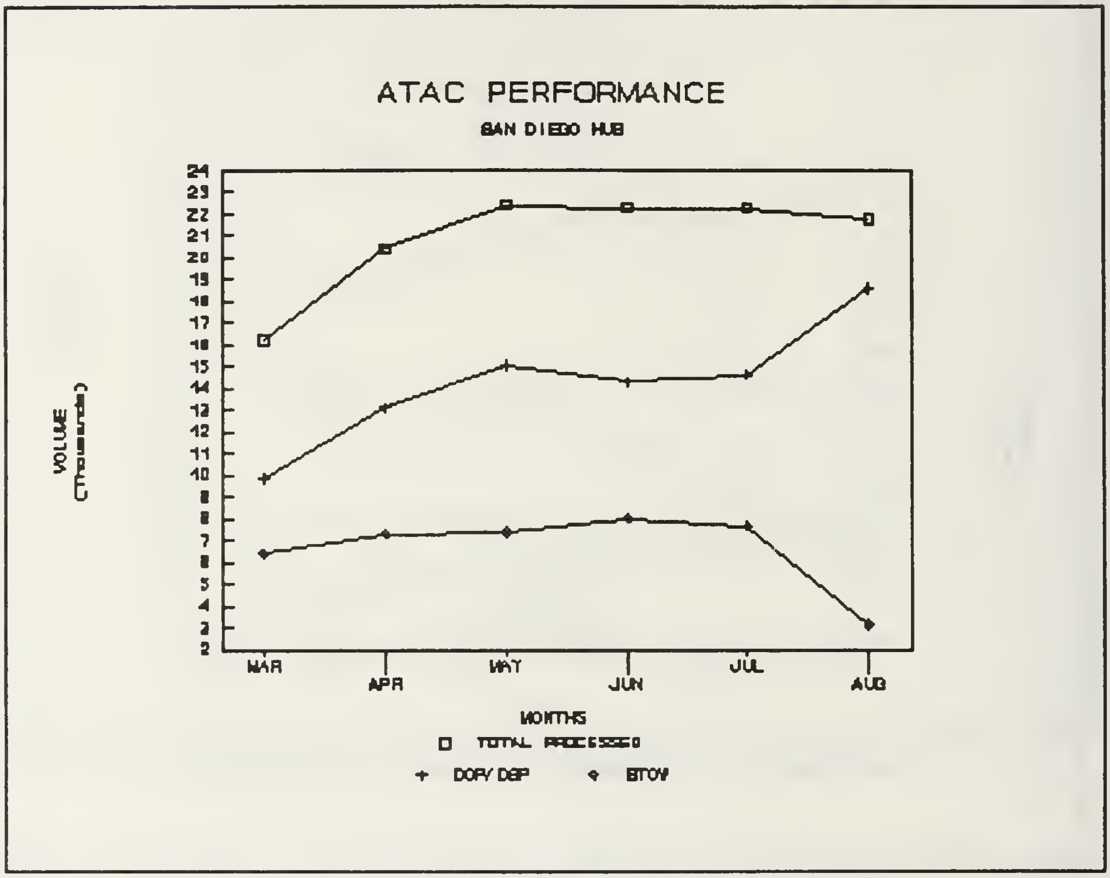

Figure 3.5. DLRs Processed - San Diego

As shown in Figure 3.6, the combined totals indicate an overall increase in DLRs processed with an increase in DLRs shipped and a decrease in DLRs stowed. The total processed monthly average was 47293, the monthly average shipped was 32597, and the monthly average stowed was 14696. Overall, Norfolk received an average of 8000 more DLRs per month than San Diego. However, judging from these reports,

Norfolk built a backlog of more than 1000 DLRs per month and San Diego processed about as many as it received.

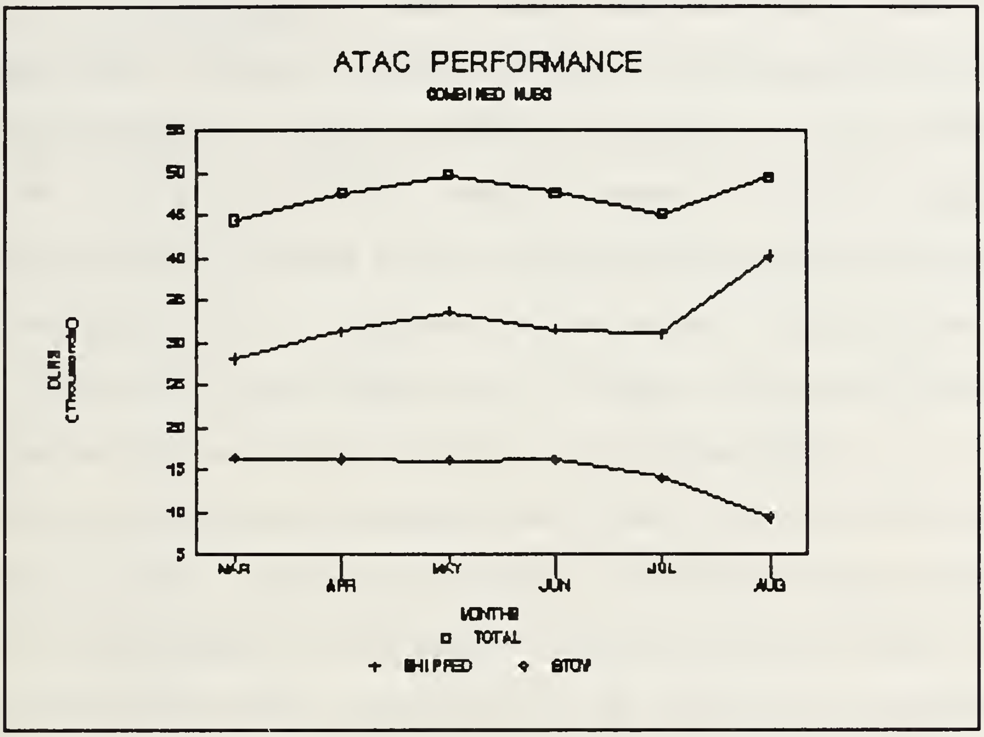

Figure 3.6. DLRs Processed - Combined

Based on the averages from these reports over the six-month period from March to August 1991, the total DLRs processed annually by San Diego can be estimated at 250,680 and by Norfolk can be estimated at 316,636. Assuming they are the only two HUBs in the system, the total average number of DLRs processed was 567,516 annually. When Subic Bay (29,700) and Cherry Point (19,608) are added in, the estimated average total number of DLRs processed annually by the ATAC system comes to 616,824. In Chapter II, Cherry Point is described as

a NODE. This is true for the current ATAC system. However, for the reporting period March through August 1991, Cherry Point was considered a HUB. NAVSUP reports indicated 676,000 DLRs were processed per year [Ref. 4;Appendix C]. During recent conversations with Dave Estep, NAVSUP, Code 0631A, we learned that the number of DLR carcasses currently processed through the ATAC system exceeds 700,000 per year. We think that part of this difference in the annual totals may be due to the fact that there are an average of 1,300 DLR carcasses per month that are caught in the Repair/HUB loop [Ref. 7].

SPCC maintains monthly statistics for misdirected DLRs and those that the item manager routes back to the HUBs from the DOPs before the items are repaired. The Item Manager (IM) continuously monitors the status of repairables. The IM determines the number of DLR carcasses that should be shipped to the DOPs and submits changes to the monthly update of the mechanized MRIL accordingly. However, the IM cannot control HUB processing of carcasses. The lag time between MRIL updates sometimes results in excess DLRs being shipped to a DOP. When a DOP receives more carcasses than it has agreed to repair, the DOP contacts the IM for resolution. Many times it is more economical to have the carcasses returned to Navy custody rather than to store them at the DOP. The IM then directs the DOP to return the excess DLRs. The DOP returns them to the HUB and the carcasses are processed all over

again. This is another system problem that has the attention of repairables management personnel at the ICP level.

IV. THE MODEL

A. INTRODUCTION

The simulation program used to develop this model is called SIMAN. SIMAN is a simulation language developed by the Systems Modeling Corporation. SIMAN has its roots in simulation programs such as GASP and SLAM. We were introduced to this program while taking logistics courses taught by Dr. Keebom Kang at Naval Postgraduate School. Although the SIMAN language was designed as a general-purpose modeling language, it is well suited to modeling large complex manufacturing systems. A few examples of successful uses of SIMAN to model commercial systems are: the layout for the Westinghouse Just-In-Time Metal Fabrication Shop, the General Motors Truck Assembly (Body and Chassis) plant and United Parcel Service's (UPS) Dispatching Service HUBs. [Ref. 8;pp. 326-329]

This chapter discusses the data selection for the model, the DLR flow through the modeled system, the actual simulation, and the results using three different data sets. The first simulation will use all of the appropriate data from Reference 4. The second simulation will use the processing times from Reference 4, but will use the stow/repair probabilities from the Reference 4 values (.44/.56, respectively) to the actual probabilities based on the ATAC

Performance reports (.31/.69, respectively). The third simulation will use only ATAC Performance report data. These simulations compare the 1989 and 1991 data.

B. MODEL DESCRIPTION

Our model is designed to meet the criteria of the Level I model described in Chapter I. It assumes an average DLR with average characteristics of the population of repairable items in the Navy's inventory. The structure represents a steady-state, serial queuing model. This model is not intended for validating the ATAC system as an improvement over past methods. The focus is on answering questions like, "when should carcasses be sent on to the DOP/DSP?"

Our model measures the total time to process DLR carcasses through the ATAC system. These carcasses are either stored at a co-located designated stock point, shipped to an outside designated stock point or shipped to a designated overhaul point for repair. No disposal actions are considered. Both ATAC HUBs (San Diego and Norfolk) are represented by one HUB in the model, with a single co-located DSP. All DOPs with their own co-located DSPs are assumed to be located some significant distance away from the HUB.

The NODEs and HUB are assumed to work five days per week. They do not work weekends. The total number of hours worked per year by each site is 2000 hours. This is based on eight

hours per day, five days per week, and fifty weeks per year. (There are ten holidays per year).

There are several ways that DLRs arrive at the HUB. Navy activities can deliver their DLRs to a NODE where they are consolidated with other DLR carcasses and shipped to the HUB. Navy activities can mail their DLRs if they meet the specifications for certified/registered mail. Or, the Navy activities can deliver their DLRs to the HUB themselves through whatever local transportation arrangements they make. The last two categories are considered to be "free-flow" DLRs as discussed earlier in Chapter III.

The model assumes that all DLRs enter the ATAC system through a NODE. No consideration is made for those that free flow into the HUB. Note that this is not a realistic assumption since more than 70 percent of the total DLRs arriving at the HUB are free-flow. However, a much more elaborate model is required to include arrival of both free flow DLRs and DLRs from the NODEs.

The processing time at the NODE and the shipping time from the NODE to the HUB for all simulations represent average times for these items as indicated in the ATAC Performance reports for the period March-August 1991 (see Chapter III and Appendices B and C). NODE processing times are not given in Reference 4, but are needed for the model to conduct comparisons. Therefore, the NODE processing times given in the ATAC Performance reports are used in each simulation.

The exponential probability distribution is assumed to represent the actual processing and shipping times at the NODE and the HUB. The model assumes a Poisson arrival rate. Therefore, the inter-arrival times of carcasses at the NODE are exponentially distributed. The time of arrival is recorded when a DLR enters the system. In the simulation model, the DLR enters the system at CREATE. As each DLR exits the system, its time in the system is calculated. The DLR exits the system when it is stowed or shipped to an external DOP/DSP (repair). At the end of the simulation, an average time that each DLR is in the system is computed and recorded in the statistics for the summary report.

C. THE COMPUTER SIMULATION MODEL IN SIMAN

1. The ATAC Experiment File

a. General Information

The simulation modeling framework is separated into the model frame, the experiment frame and analysis frame. Two frames/files are linked together to actually run the computer simulation. [Ref. 8;P. 25] They are the model and experiment files. The model is a functional description of the components of the system and their interactions. The experiment defines the experimental conditions under which the model is run.

The actual Experiment File for this simulation is shown in Figure 3.1.

```
BEGIN;
    PROJECT,ATAC Processing,RMD;
    ATTRIBUTES:TimeIn;
    TALLIES:StowTime:
    SystemTime;
    REPLICATE,1,0,500,,,4.0;
END;
```

FIGURE 3.1. Experiment File

b. The Elements of the Experiment

The PROJECT element is used by SIMAN in labeling the SIMAN Summary Report, which will be discussed later in this section. This element automatically triggers the output of the summary report at the end of each replication. T h e ATTRIBUTES element is used to define special-purpose requirements concerning entities of the system. In this case, the entities are batches of DLR carcasses arriving and flowing through the ATAC system. We want to know the total time it takes an entity to flow through the system. This time is measured from the time the entity enters the system until it exits at the end of a particular process. We called this ATTRIBUTE "TimeIn".

The TALLY element is a register used to record the total time required for an entity to move through the system. In this case, there are two TALLIES: StowTime and SystemTime. StowTime reflects the total time it takes the entity from arrival into the system until it is stowed at an internal DSP. SystemTime reflects the total time it takes a different entity

from arrival into the system until it arrives at either an external DSP for storage or a DOP for repair.

The REPLICATE element controls the number of times the simulation is run (replicated), the length of each replication and the initialization options of each replication. We ran one replication representing 500 weeks or ten years of ATAC production for each of the three data sets described in the second paragraph of this chapter. The first month's statistical data was discarded since it was the time during which the model was building to its "steady-state". The statistics in the summary report therefore represent nine years and 11 months of data.

2. The ATAC Model File

a. General Information

Process orientation is used for modeling discrete systems in SIMAN. [Ref. 8] In process orientation, a particular system is modeled by studying the entities that move through the system. The model consists of a description of the process, i.e., a sequence of operations or activities through which entities move.

The word "entity" is a generic term used in SIMAN to denote any person, object or thing whose movement through the system causes change in the state of the system. Entities are dynamic in SIMAN.

> In SIMAN, entities are dynamic; their entrance to and exit from the model correspond to their arrival and departure from the system. The number of entities in the model changes each time a new entity enters the model or an existing entity exits the model. [Ref. 8;p. 62]

There can be many entities in the system, each with its own unique, specific characteristics. These characteristics are referred to as ATTRIBUTES in SIMAN. Processes are static (dormant) and must be activated by entities.

The actual Model File used in this simulation is shown in Figure 3.2. It represents the entire ATAC process from the time a DLR arrives at a NODE until it is processed through the HUB to stowage or repair.

```
BEGIN,Y,ATAC;
;    Model based on NAVSUP averages
       CREATE:POIS(0.2): MARK(TimeIn);
        DELAY:EXPO(0.2);   NODE processing
        DELAY:EXPO(0.4);   Shipping from NODE to HUB
        DELAY:EXPO(0.1);   Agent receipt/turnover
        DELAY:EXPO(0.4);   HUB screening & packing
          BRANCH,1:
           With,.44,Stow:  !Stow/Repair decision
           Else, Repair;
Stow   DELAY:EXPO(0.2);    Time to stow
       TALLY:StowTime,INT(TimeIn): DISPOSE;
Repair DELAY:EXPO(0.2);    Consolidate carcasses
       DELAY:EXPO(0.8);    Shipping time to DOP
       TALLY:SystemTime,INT(TimeIn): DISPOSE;
END;
```

Figure 3.2. Model File

b. The Elements of the Model

The CREATE element begins the movement of the carcass through the model. The average number of arrivals is

one DLR carcass per day of a five-day work week. (This model measures time in units of weeks). The Poisson distribution is used to model the number of DLR carcasses arriving into the ATAC system.

The MARK element marks the clock time that the entity enters the ATAC system. TimeIn is the attribute used to keep track of the time each entity is in the system and will be used in summary calculations describing system performance.

The DELAY element "holds" the entity for a specified period of time. Each simulated delay corresponds to the time it takes to perform the indicated process as the entity moves through the system. The first delay is from the screening and processing at the NODE; its average time is one day or 0.2 weeks. Actual processing time is assumed to be exponentially distributed (EXPO). In reality, that time will vary depending on the particular DLR carcass. Some are easily identified and packaged for transhipment while others may present considerable difficulties. More representative probability distributions than the exponential can be determined once the most current ATAC data base tapes are examined and statistical analysis is conducted on that data.

The second delay is the shipping time from the NODE to the HUB. This time averages two days or 0.4 weeks. The third delay is the ATAC agent's receipt and turnover time (to

HUB government personnel). This time averages one-half of a day or 0.1 weeks. The fourth delay is associated with the HUB government personnel screening and packing the DLR carcasses for shipment/storage. The delay includes stow time at the co-located DSP. Stowing takes an average of one day. The first delay included in the Repair branch (branch is defined in the next paragraph) represents the time the agent takes for shipment consolidation. The average time is one day or 0.2 weeks. The second delay included in the Repair branch represents shipping time from the HUB to the external DSP/DOP. This averages four days or 0.8 weeks. As indicated by EXPO, all the actual delay times are assumed to be exponentially distributed.

The BRANCH element signifies a choice between two processes. The choice here is between stow at the co-located DSP and repair/stow at an external DOP/DSP. Forty-four percent of the batches will be stowed and the remainder will be shipped to an external DSP/DOP.

The TALLY elements store the total time it takes an entity to move from the CREATE block to the time it exits the system at the end of a process. Both the tallies for this model were explained in the section on the Experiment File.

The DISPOSE element ends the existence of the entity in the system. In this model, the first DISPOSE element is for the stow at the co-located DSP. The second

DISPOSE element is for those carcasses that leave the ATAC HUB for shipment to an external DOP/DSP.

3. The ATAC Output File

a. General Information

The output file was mentioned in the description of the project element of the experiment file. It contains the SIMAN summary report. The summary report consists of the name of the project, the name of the analyst, the date of the simulation run and latest model revision, the replication end time (last observed week in this model), a summary for each replication run, and the total CPU run time in minutes and seconds. The elements or TALLY VARIABLES are then listed in a tabular format. The summary maintains only the summary statistics including the mean, coefficient of variation, minimum and maximum values for the observed variables and number of observations for the tally register for each simulation run.

A representation of the actual ATAC Output File is shown in Figure 3.3. Although the run time is not included, it was four minutes and 15 seconds.

Summary for Replication 1 of 1

Project: ATAC Process   Run execution date : 11/22/1991
Analyst: RMD   Model revision date: 11/22/1991
Replication ended at time: 500.0 (weeks)

TALLY VARIABLES*

Identifier	Avg	Variation	Min	Max	Observations
StowTime	1.2909	.48584	.11218	4.3166	1105
SystemTime**	2.0989	.50707	.25623	8.4391	1457

*Units of time are measured in weeks.
**SystemTime is average total process time to DSP/DOP.

Figure 3.3. Summary Report

b. The Elements of the Output File

1. Average: The average of all observations for the appropriate category being observed.

2. Variation: The coefficient of variation or the measurement of absolute variation. Variation ranges from 0 (no variation) to infinity (extremely large variation).

3. Minimum: minimum observed time recorded.

4. Maximum: maximum observed time recorded.

5. Observations: sample size.

c. Stow Time

Average: The simulation estimated that the average time to process a carcass through the ATAC system to stow/dispose is slightly more than six work days (1.29 weeks). The results are typical of the real system when the DLRs are initially turned in at a NODE and the items are easily identifiable and require very little research or packing.

Variation: The simulation model yielded a value of 0.486 weeks.

Minimum: The simulation model yielded a value of 0.112 weeks and represents a one-day total processing time for a well-identified carcass requiring little packaging. As stated earlier, this is representative of the majority of DLRs in the ATAC system.

Maximum: The simulation model yielded a value of 4.317 weeks and represents a problem carcass requiring significant research to identify, significant packaging problems and/or having an extended shipping time. There are a few items that are difficult to identify. According to our conversations with the floor supervisor at the San Diego HUB, such items can take more than three weeks to identify. Some require special packing which adds to the processing time as well.

Observations: The simulation sample size was 1105 DLRs over the last nine years and 11 months of the ten-year simulation. These DLRs that went to stow at the co-located DSP are 43 percent of the total observations (44 percent was the input parameter in the Model File for the stow probability).

d. System Time

Average: The simulation model estimated the average time to process a DLR carcass through the ATAC system

and to ship it to an external DOP/DSP is about ten working days (2.0989 weeks). This time included processing a DLR into and through a NODE, shipping it to a HUB, having it screened and packed, turning it over to the shipper and having it delivered to a DOP/DSP.

Variation: The simulation model yielded a value of 0.507 weeks which is slightly higher than the variation for stow time. This higher value is expected because more delays are involved.

Minimum: The simulation model yielded a value of 0.256 weeks, which corresponds to a two-day total time period to process and ship a well-identified carcass requiring little packaging to a DOP/DSP. This carcass may have been delivered to a nearby DOP/DSP or shipped by air to a distant DOP/DSP under Advanced Shipping. Upon arrival at the receiving activity, the DLR bypasses the activity's central receiving area and is stowed within one day of arrival.

Maximum: The simulation model yielded a value of 8.439 weeks, which represents a very long period of time to process and ship a carcass to the DOP/DSP. This is rare. During our discussions with the floor supervisor at the ATAC HUB San Diego, he said some DLRs can take as long as three weeks. Longer delays were never mentioned.

Observations: The simulation sample size was 1457 DLRs or 57 percent of the total observations.

D. A COMPARISON BETWEEN 1989 AND 1991 DATA

1. Simulation output

Figure 3.4 shows the output of three different simulation runs. The first run is based on the 1989 NAVSUP data from Reference 4. The average processing/delay times from arrival at the HUB through shipping to the DOP/DSP are taken from Reference 4. The second run is based on the average Screen Time determined from the ATAC Performance Reports for the period March through August 1991 as discussed in Chapter III (i.e. The average for Screen to Stow is three days and the Screen to DOP/DSP average is four days instead of two days as in the first run). For the third run, the screen times were kept the same as in the second run. The probabilities for the Stow/Repair decision were changed to 0.31 and 0.69, respectively.

TALLY VARIABLES

1989 NAVSUP Data Stow/Repair (0.44/0.56)

Identifier	Avg	Variation	Min	Max	Observations
StowTime	1.2909	.48584	.11218	4.3166	1105
SystemTime	2.0989	.50707	.25623	8.4391	1457

ATAC Report 1: Stow/Repair (0.44/0.56)

Identifier	Avg	Variation	Min	Max	Observations
StowTime	1.4675	.51423	.21766	6.2290	1037
SystemTime	2.5142	.48983	.37716	7.8097	1347

ATAC Report 2: Stow/Repair (0.31/0.69)

Identifier	Avg	Variation	Min	Max	Observations
StowTime	1.4948	.53040	.18344	6.5660	786
SystemTime	2.4804	.47862	.34949	10.0870	1702

*Units of time are measured in weeks.
*SystemTime (repair) is average total process time to DSP/DOP.

Figure 3.4. Comparison Summary Report

2. Simulation Output Comparison

The discussion of the simulation output will follow in order from the average through the observations for each of the tallies.

a. StowTime

Average: There is an increase from 1.2909 weeks in the 1989 NAVSUP output to nearly 1.5 weeks in mean stowtime in ATAC Reports 1 and 2. The average is slightly larger when the probability to stow decreases from 0.44 (NAVSUP) to 0.31 (ATAC reports).

Variation: Increases slightly from .4858 in the 1989 NAVSUP output to .5304 for ATAC Report 2.

Minimum: Increases from one-half day in the 1989 NAVSUP output to a full day in both ATAC Reports. The increase is greater under the 1989 NAVSUP probabilities because more DLRs are processed to stow.

Maximum: Increases from just over four weeks to as much as six and one-half weeks.

Observations: Fewer observations are made due to the reduced flow through the system. The decrease of 251 between the ATAC Report 1 and ATAC Report 2 is due to the decrease in the stow probability from 0.44 to 0.31.

b. SystemTime

Average: The average time in the system increases from just over two weeks in the 1989 NAVSUP output to two and one-half weeks in ATAC Report 2.

Variation: Decreases slightly from .5070 weeks in the 1989 NAVSUP output to .4898 weeks and .4786 weeks, respectively, in ATAC Reports 1 and 2.

Minimum: Increases from just over one day in the 1989 NAVSUP output to nearly two days in ATAC Reports 1 and 2.

Maximum: Decreases slightly from 8.4391 weeks in the 1989 NAVSUP output to 7.8097 weeks in ATAC Report 1, but remains close to eight weeks. Then it increases to 10 weeks in ATAC Report 2 when the probability for repair is increased from 0.56 to 0.69. Again, more DLRs in the pipeline result in increased delays.

Observations: The number decreases with the increased processing time. The increase from ATAC Report 1 to ATAC Report 2 is due to the higher probability of repair.

Based on these results, it appears the ATAC system was faster in 1989. However, the number of personnel at the San Diego HUB has decreased from 37 to 23 over the past year. This would have a significant effect on the output for that HUB. Also, more DLRs are being processed through the system. This will result in increased backlogs. There may have been other changes affecting the speed at which DLRs are processed, such as more stringent packing requirements or shipping requirements. If it takes more time to pack a DLR for shipment than it does to stow, the more stringent requirements would affect productivity. Mis-directed DLRs and DLRs returned by the DOP without repairing them also add to the workload at the HUBs. More in-depth analysis is required to evaluate the actual effects of these and other variables on the ATAC system.

V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter will summarize the previous chapters and present conclusions reached. Recommendations for improvement of the ATAC system and further research are then presented.

A. SUMMARY

The ATAC process was described in Chapter II. The movement of DLR retrograde through the ATAC system was described from NODES to HUBS and finally to a DSP/DOP. The actual processing sequence of repairable components at the NSC San Diego HUB was documented in detail in Chapter II. This process description was the basis for the model presented in Chapter IV.

Chapter III reviewed problems the authors had obtaining data which could be useful in building and validating a complex simulation model of the ATAC system. Problems associated with the data obtained from the ATAC data base were also listed. Questions and discrepancies found in the ATAC Performance reports are discussed in Appendix A.

Chapter IV discussed a simple simulation model for an aggregate DLR being processed by the ATAC system. The simulation model was designed to measure the total time to process DLR carcasses through the ATAC system. Average times for ATAC system activities were obtained from NAVSUP for 1989

and the ATAC Performance reports from March through August 1991 as discussed in Chapter III. Three different runs were made to compare the 1989 and 1991 data. Each run represented ten years of ATAC system operation.

B. CONCLUSIONS

1. Can a simulation model of the ATAC system be developed? The answer is "definitely". The model we presented in Chapter IV was, as stated, a simplified aggregate model of the Navy ATAC carcass return process. This model does, however, show how easy it would be to model a much more complicated version using SIMAN. Due to the data problems discussed in earlier chapters and in Appendix A, few parameters were built into this model that one could use to examine the effect of changes to the system. It does allow one to simulate total time to stow and total time in the system. The effects of some policy decisions on average system time can be shown with this model. For example, the effect on the entire ATAC system of changing the stow/repair probabilities can be simulated.

2. Is there accurate and detailed data available that can be used in the model?

The problems with the data that were described in Chapter III did not allow the authors to build a more complex model than the one described in Chapter IV. For example, without the data it was impossible to determine real world probability

distributions for either all DLRs as a whole or individual DLRs. This was unfortunate in that the ATAC data base is structured to give most of the data needed to build a more elaborate model. Times for each of the following stages of the ATAC process should be available in the new ATAC data tapes for the period from April through September 1991, which arrived too late to be included in our research.

1. Shipment from originating activity to a NODE or HUB
2. Processing at the turn-in point
3. Storage at the turn-in point
4. Shipment from NODE to HUB
5. HUB processing
6. Storage after processing
7. Shipment to a DSP/DOP.

The time that a carcass spends in each of the various stages of the system is needed to design and validate an elaborate model that would allow the assessment of the impact of proposed policy changes NAVSUP may consider in responding to DMRD 901.

As discussed in Chapter III and Appendix A, we found that data problems even existed in the reports used to reflect the true performance of the current ATAC system. These reports, called the "SUP" reports or ATAC Performance reports are confusing. There is a definite need to define more specific categories to identify the various types of counts that are

included in the final totals of DLRs received by the ATAC agent, DLRs turned over to the HUB for processing, DLRs screened and packed, DLRs returned to the ATAC agent and DLRs shipped to DSP/DOP.

The M6 and M6E reports both indicate specific processing data from the HUBs. However, each report counts the total DLRs differently. Apparently the M6 report is designed to reflect the ATAC agent's performance and the M6E report is designed to reflect the performance of the government HUB personnel. There also is no category identifying non-ATAC material exceptions. This category is needed to clarify the difference between the total items the ATAC agent receives and the total number of DLRs turned over to the HUB for processing. Finally, there is no identification of exceptions found by the HUB. This is needed to clarify the difference between total received and total processed.

The M6 report erroneously includes DLRs sent to stow/disposal in the total DLRs returned to the ATAC agent. DLRs sent to stow/disposal are never returned to the agent following packing. They are turned over to local storage personnel at the HUB or delivered to the local disposal cite by government personnel.

Subic Bay's DLRs which are transhipped by the San Diego ATAC HUB to distant DSP/DOPs are not identified separately. San Diego's total number of DLRs shipped is therefore overstated.

The difference between total DLRs received and free flow DLRs indicated on the M6E report should represent the total number of DLRs received from the NODEs. However, there are several program problems that prevent this from happening. NAVMTO, Code 033B is taking action to resolve these problems.

The personnel at the San Diego HUB were unfamiliar with the "SUP" reports. This is because the HUBs do not request access to the NCTAMS LANT ATAC data base due to funding constraints. NCTAMS LANT is a Navy Industrial Fund activity and must be reimbursed for providing services to the HUBs.

3. What are the ATAC operating procedures and what problems have been found?

We obtained the detailed ATAC operating procedures by visiting the San Diego HUB. However, during our visit to the San Diego HUB, a problem was identified with "revolving" DLR carcasses. The problem concerns carcasses that are directed to be shipped to a commercial DOP during the screening process by the mechanized MRIL. Upon arrival at the DOP, the DOP sometimes determines that these are excess requirements that cannot be repaired during the current quarterly cycle. The DOP contacts the ICP item manager to report these excess DLR carcasses and requests appropriate action be taken. The item manager normally determines that the cost of returning the items to the HUB is cheaper than having the DOP or local DSP store them, so the carcasses are returned to the HUB where they are processed again by the ATAC system. Hopefully, the

item manager has at this point notified the HUB of the change to the MRIL so that the carcasses will go into storage at the HUB rather than being sent back to the DOP again.

We also noticed at the San Diego HUB that there were several frustrated DLRs backlogged in the screening area. The supervisor assured us that the longest any frustrated item is held is approximately three weeks. Although the number of items appeared small, we did not see any type of report to identify these items. Based on the volume of business at the HUBs, these items could very easily become lost.

C. RECOMMENDATIONS

The following are recommendations to improve the ATAC system or to provide areas for further research:

1. The M6 and M6E ATAC Performance reports should be combined and the definitions of the variables they measure reconciled. The different totals can then be identified for what they represent. Adding an additional category to identify non-ATAC material exceptions would clarify the difference between the total items the ATAC agent receives and the total number of DLRs that are turned over to the HUB personnel for processing. In addition, a category for HUB exceptions would clarify the difference between the total DLRs received and the total processed. By identifying the number and general type of exceptions, any problem areas could be quickly identified and dealt with expeditiously. The number of exceptions also seems excessive. This may be another area for future research.

2. The count for DLRs sent to stow/disposal should be identified separately in report M6. Presently, it is included in the total DLRs returned to the ATAC Agent. Further, separate counts for those DLRs sent to stow and those sent to disposal should be reflected in the

reports. This will facilitate monitoring disposal activity.

3. We highly recommend the use of SIMAN for any future simulation modeling endeavor.

4. Frustrated DLRs should be identified and reported regularly to HUB management personnel. Regular written reports should be instituted if not already in existence. The complexity and size of the ATAC data base allows for DLRs to get lost in the system if they are not prudently tracked. Visibility of these frustrated items should be maintained at least locally to prevent any of these items from becoming lost in the system.

5. Those who continue the research effort begun on this thesis topic should be funded to travel to both HUBs, both ICPs and NAVSUP. They should spend at least two days at each activity; more if necessary. This should allow enough time to see the processes as they occur, discuss the problem areas with the people involved on a daily basis and develop additional questions as they come up. Prior to travel, contact Dave Estep, Code 0631, NAVSUP to obtain the latest operating procedures/instructions concerning the ATAC system.

6. At least one Operations Research student and a faculty member with a strong background in simulation modelling should examine the four computer (IBM) computer tapes recently provided by NAVMTO, Code 033B. These are supposed to contain the ATAC data base from April through September 1991. If the data is found to be sufficient, development of an extensive model could begin. Mr. Barraco, NAVMTO should be contacted if more current tapes and copies of the latest NAVSUP reports are needed.

APPENDIX A

This appendix will discuss the problems and discrepancies discovered with the ATAC data sources. We will first discuss the ATAC data base tapes and then the ATAC Performance reports.

A. ATAC Data Base Discussion

The ATAC data base has come to be known as the NARDAC ATAC data base [Ref. 5]. NARDAC was the Navy activity that managed the computer hardware used to maintain the data base. Due to an official name change in April 1991, NARDAC is now called Naval Computer and Telecommunications Area Master Station LANT (NCTAMS LANT). The name of the data base remains the ATAC data base.

Mr. Barraco assured us that the most recent six months of data were the most complete he has assembled over the past two years. However, there was a delay in obtaining the tapes due to the bureaucratic structure involved. NAVMTO generates the reports, but the computer hardware is owned by NCTAMS LANT. NCTAMS LANT is a Navy Industrial Fund (NIF) activity, which means they are not funded to run tapes for NPS thesis students (neither is NAVMTO for that matter). Therefore, the funding had to come from NAVSUP. Dave Estep agreed to fund the tapes on 15 October 1991. However, the funding had not been

received at NAVMTO on 5 November 1991. Mr. Barraco took the initiative to have the tapes prepared and shipped them to us prior to receipt of the funding. The data tapes did arrive on 12 November 1991, but were too late to be included in our research. The four reels of tape have been turned over to Professor McMasters for use in further ATAC research efforts.

B. ATAC Performance Reports

The reports are confusing. Examples of the individual reports are included as Appendix B. Consolidated reports are included as Appendix C. Significant differences are as follows.

1. It appeared initially that reports M6 and M6E reported the same information. The M6 report indicated Total Number of DLRs Received from the ATAC Agent. This number should represent all the DLRs delivered to the HUB since all DLRs must go through the agent before the HUB personnel receive them for screening and packing. Paul Barraco explained that the count really represents the DLRs received by the HUB from the ATAC agent directly into the screening process. [Ref. 10] These items show a Date Into Screen (the date the items are processed into screening by the HUB personnel) in the ATAC data base. The count does not include exception items excluded from the ATAC program. The M6E report indicates the Total Number of DLRs Received. This total is different from the total number of DLRs on the M6 report. The M6E report total represents the DLRs received by

the ATAC agent. These DLRs show a Tailgate Date (date of arrival at the HUB) in the data base. The difference between the two totals should be the number of exceptions rejected by the agent to the co-located government activity. Table 1A shows the differences. The April difference erroneously indicates that exceptions were added to the total rather than taken away. The July difference appears to be excessive when compared to the other months.

TABLE 1A

	MAR	APR	MAY	JUN	JUL	AUG
DLRS REC'D FROM ATAC AGENT (M6):	51863	52262	48917	45875	33150	48994
TOTAL DLR'S REC'D (M6E):	53519	49279	49470	46125	43354	50086
DIFFERENCE:	-1656	2983	-553	-250	-10204	-1092

2. The M6 report indicates the Total DLRs Returned to the ATAC Agent after processing at the HUB. This number should represent the DLRs returned to the agent for transhipment to a DOP/DSP. However, this category counts the number of DLRs that have <u>either</u> a date out of screen <u>or</u> a date to stow or dispose. The stowed or disposed items were included in an attempt to close the loop so the number of DLRs received from the ATAC Agent would equal the number of DLRs returned to the ATAC Agent plus the number of DLRs sent to stowage or disposal locally. Apparently, the number of items stowed versus the number sent to disposal will be broken out in the future for

clarity. The M6E report indicates the Number of DLRs Shipped to the DOP/DSP. Again, the M6 report totals for transhipped DLRs do not agree with the M6E report totals for the number of DLRs shipped to the DOP/DSP. Paul Barraco provided several lengthy reasons why these counts do not agree. The fact is that these numbers are not compatible and in the current reports should not be compared. Table 2A gives a clear picture of the differences.

TABLE 2A

	MAR	APR	MAY	JUN	JUL	AUG
DLRS RETURNED TO AGENT (M6)	49586	42051	41628	38714	37432	37509
TOTAL SHIPPED TO DOP/DSP (M6E):	28042	31321	33600	31456	30964	41201
DIFFERENCE:	21544	10730	8028	7258	6468	-2692

3. The difference between the total DLRs received from ATAC agent and the total DLRs returned to the ATAC agent represents the DLRs that were stowed or disposed of locally. The difference reflected on the M6 report and the totals indicated on the M6E report for DLRs to stow do not agree. Again, these are "apples and oranges". The stow/disposal numbers are included in the number of DLRs returned to the ATAC agent in the M6 report.

4. The difference between total DLRs received and free flow DLRs on the M6E report should represent the total received from the NODEs. There are only two ways DLRs arrive

at the HUB. They are either shipped from a NODE or they free flow in. Free flow includes registered/certified mail, DLRs shipped directly to the HUBs from Navy activities other than NODEs, or delivery by a representative from a local ship/activity. The differences between DLRs received and free flow DLRs do not agree with the totals indicated on the NODE reports (M6A, M6B, M6C) for the same period of time. According to Paul Barraco, this difference was intended to represent DLRs from the NODEs. Due to numerous "program glitches" it does not. NAVMTO is investigating to see if there is a problem with material being processed at the NODEs and not being received at the HUBs.

5. Part of the problem is that one HUB can process DLRs to another HUB. The processing HUB enters its Unit Identification Code (UIC) and the document number when it processes the item and the receiving HUB enters its UIC and the same document number upon receipt. The programs allow receipt information to overlay the processing HUB's data because the UIC is different. This allows some tracking of the material through the system, which is good for knowing where the material is located, but confuses statistical output.

Table 3A shows the differences between what the M6E report shows as DLR receipts from the NODEs and the actual totals reported by the NODEs.

TABLE 3A

	MAR	APR	MAY	JUN	JUL	AUG
DIFFERENCE (M6E):	15035	14959	14286	13355	13357	13659
NODES (M6A,B,C):	14311	14731	14893	13462	13365	14349
DIFFERENCE:	724	228	-607	-107	-8	-690

Mr. Barraco has been very supportive of our research and responds in a timely manner. He has been eager to correct any discrepancies and to ensure that our interpretation of the data is accurate. Paul has mentioned that the ATAC data base is being transferred to a mainframe computer (IBM 3090) at SPCC to improve Navy-wide access to the data base. He also mentioned that FMSO analysts will direct some of their attention to improving the accuracy of the data base. He has made it clear that NAVMTO is mainly concerned with tracking the DLRs and that is the primary purpose of the ATAC data base. Statistics are just a by-product of the data and require extensive research to ensure accuracy.

ATTACHMENT A

RECORD CONTENT SHEET (RCS)
FOR
INVENTORY CONTROL POINTS TAPE

RECORD POSITION	FIELD LEGEND	CHAR A/N	CHAR N	DESCRIPTION
001-006	ORIGUIC	6		SERVICE DESIGNATOR AND UNIT IDENTIFICATION CODE (UIC) OF THE ORIGINATOR
007-010	JULIANDT	4		JULIAN DATE IN THE DOCUMENT NUMBER; DATE DOCUMENT CREATED
011-014	SERIALNO	4		SERIAL NUMBER IN THE DOCUMENT NUMBER THAT IS ASSIGNED BY THE ORIGINATOR
015	DUPID	1		SUFFIX ADDED TO THE ORIGINAL DOCUMENT NUMBER BY THE ATAC CONTRACTOR WHEN MORE THAN ONE ASSET IS TURNED IN ON THE DOCUMENT NUMBER
016-018	TCN1	3		LAST THREE DIGITS OF THE TRANSPORTATION CONTROL NUMBER (TCN)
019-022	FSC	4		FEDERAL SUPPLY CLASS
023-031	NIIN	9		NATIONAL ITEM IDENTIFICATION NUMBER
032-033	SMIC	2		SPECIAL MATERIAL IDENTIFICATION CODE
034-050	NODELTCN	17		LEAD TCN USED TO MOVE ASSET FROM NODE TO HUB
051-067	HUBLTCN	17		LEAD TCN USED TO MOVE ASSET FROM HUB TO DSP/DOP
068-073	NODEUIC	6		UIC USED BY THE ATAC CONTRACTOR AT THE NODE
074-079	HUBUIC	6		UIC USED BY THE ATAC CONTRACTOR AT THE HUB
080-083	DT_RECV_NODE		4	DATE ATAC CONTRACTOR RECEIVED THE ASSET AT THE NODE; DATE OF FIRST VISIBILITY
084-087	DT_AVAIL_NODE		4	DATE ATAC CONTRACTOR MADE THE ASSET AVAILABLE TO THE CARRIER AT THE NODE; USE AS PROOF OF SHIPMENT (POS) DATE
088-091	DT_SHIP_NODE		4	DATE THE CARRIER PICKS UP THE ASSET FROM THE NODE; PROVIDED BY THE CARRIER; DATE WILL BE BLANK FOR ALL EXCEPT ATAC GTA SHIPMENTS AND CERTAIN QUICKTRANS SHIPMENTS.
092-095	TAILGATE_DT		4	DATE ASSET RECEIVED AT THE HUB; THIS DATE IS WHEN THE TRUCK PULLS UP AT THE HUB EXCEPT AT CHERRY POINT HUB WHERE IT IS THE DATE RECEIVED FROM THE GOVERNMENT PERSONNEL (SAME AS OUT OF SCREEN DATE); DATE OF FIRST VISIBILITY FOR ASSET NOT TURNED INTO NODE
096-099	DT_OFFLOAD_AHUB Blank		4	DATE ASSET TAKEN OFF TRUCK AND PREPARED FOR SCREENING PROCESS

RECORD CONTENT SHEET (RCS)
FOR
INVENTORY CONTROL POINTS TAPE

RECORD POSITION	FIELD LEGEND	CHAR A/N	CHAR N	DESCRIPTION
[illegible]	DOC_ID	[illegible]		DOCUMENT IDENTIFIER
103	NSN_CHANGE B	1		THE NUMERIAL "1" IS PLACED IN THIS FIELD IF THE NSN WAS CHANGED SINCE THE RECORD WAS ORIGINALLY ESTABLISHED; CONSULT THE LIST OF OLD NSNs PROVIDED WITH THE DATA BASE
104	TCN_CHANGE B	1		THE NUMERIAL "1" IS PLACED IN THIS FIELD IF THE TCN/DOCUMENT NUMBER WAS CHANGED SINCE THE RECORD WAS ORIGINALLY ESTABLISHED; CONSULT THE LIST OF OLD TCNs/DOCUMENT NUMBERS PROVIDED WITH THE DATA BASE
105-107	LOGON_ID ?	3		DATA ENTRY CLERK'S INITIALS EXCEPT WHEN THE GTA CARRIER POST POD INFORMATION TO THE RECORD, THIS FIELD CHANGES TO 'GTA'.
108-109	COG	2		STORES ACCOUNT AND MATERIAL COGNIZANCE OF THE ITEM.
110	CONDITION_CODE	1		CONDITION CODE THAT IDENTIFIES THE MATERIAL AS SERVICEABLE OR UNSERVICEABLE.
111-112	ITEM_PRIORITY	2		ITEM PRIORITY FROM THE TURN-IN DOCUMENT.
113-114	SHIP_PRIORITY B	2		THIS IS CURRENTLY DICTATED BY SUP 04 AND IS BLANK IN THE ATAC DATA BASE.
115-116	ADVICE_CODE B	2		ADVICE CODE.
117	MGMT_CODE B	1		MANAGEMENT CODE.
118-128	ITEM_PIECES ?	[illegible]		NUMBER OF PIECES UNDER THIS DOCUMENT NUMBER.
129-139	ITEM_WEIGHT	[illegible]		WEIGHT OF ITEM(S) UNDER THIS DOCUMENT NUMBER.
140-150	ITEM_CUBE ?	[illegible]		CUBIC SIZE OF THE ITEM(S) UNDER THIS DOCUMENT NUMBER.
151-156	EXCEPT_CODE B	6		EXCEPTION CODE ENTERED BY NODE ATAC CONTRACTOR. THIS EXCEPTION CODE INDICATES THAT THE ITEM IS HAZARDOUS, CLASSIFIED, ETC.
157-160	DT_TURNOVER_ACTVY		4	DATE RETURNED/TURNED OVER TO NODE GOVERNMENT CO-LOCATED ACTIVITY. THIS IS THE DATE THE NODE ATAC CONTRACTOR GIVES THE ASSET TO THE CO-LOCATED ACTIVITY BECAUSE THE ASSET IS NOT HANDLED BY THE ATAC SYSTEM.
161-180	SIGNATURE_TURNOVER B	20		SIGNATURE OF NODE'S GOVERNMENT PERSON RECEIVING THE ASSET.

INVENTORY CONTROL POINTS TAPE

RECORD POSITION	FIELD LEGEND	CHAR A/N	CHAR N	DESCRIPTION
[illegible]	[illegible]NATURE_RETURN_[illegible]	20		SIGNATURE OF NODE'S ATAC CO[illegible] PERSON RECEIVING THE ASSET BAC[illegible] FROM THE CO-LOCATED [illegible] ACTIVITY.
201-[illegible]	DT_RECVBACK_ACTVY		4	DATE NODE'S ATAC CONTRACTOR RECEIVE[illegible] THE ASSET BACK FROM THE GOVERNMENT CO-LOCATED ACTIVITY.
205	MODE_TRANS_HUB	1		MODE OF TRANSPORTATION TO HUB
206-209	DT_MAC_[illegible]ART		4	DATE MAC FLIGHT DEPARTED (MAC LIF[illegible] DATE)
210-213	DT[illegible]		4	DATE ASSET TURNED OVER TO MAC [illegible]SEAS
214-216	[illegible]_PORT_[illegible]BARK	3		PORT IN THE CONTINENTAL UNI[illegible] STATES THAT THE OVERSEAS SHIPMENT IS BOUND FOR AND WILL EXIT ([illegible]ARK) THE MAC SYSTEM FOR FURTHER SHIPMENT/PROCESSING.
217-220	[illegible]CONUS		4	DATE SHIPMENT FROM O[illegible]SEAS IS RECEIVED BY A CONTINENTAL UNITED STATES CARRIER FOR [illegible]URTHER SHIPMENT. NOT USED.
221-[illegible]37	WAYB[illegible]LL_NUMBER_HUB	17		WAYBILL NUMBE[illegible] USED BY THE CARRIER TO MOVE THE ASSET UNDER FROM A NODE TO A H[illegible].
238-241	INBO[illegible]D_REMARKS	4		CARRIER'S REMARKS CONCERNING THIS SHIPMENT FROM A NODE TO A HUB.
242-245	DT_INHUB_SCREEN		4	DAT[illegible] THE ASSET WAS GIVEN TO THE GOVERNMENT HUB PERSONNEL BY THE HUB A[illegible] CONTRACTOR FOR SCREENING.
246-249	DT_RECV_AFT_SCREEN		4	[illegible] THE HUB ATAC CONTRACTOR RECEIVED THE ASSET FROM THE GOVERNMENT HUB PERSONNEL FOR TRANSHIPMENT. THIS IS USUALLY THE SRAPR DATE ALTHOUGH THE DATE CAN BE ENTERED MANUALLY.
250-253	BACKDOOR_RECEIPT		4	DATE THE HUB ATAC CONTRACTOR AT THE NAVAL SUPPLY CENTER, SAN DIEGO RECEIVES AN ASSET SHIPPED FROM THE SUBIC BAY, PHILIPPINES HUB.
2[illegible]-264	ITEM_TRANSHIP_WGT		11	WEIGHT OF THE ASSET WHEN IT IS PACKED FOR TRANSHIPMENT FROM THE HUB TO THE NEXT POINT.
265	MODE_SHIP_D[illegible]DSP	1		MODE OF SHIPMENT FROM HUB TO DOP/DSP.
266-282	WAYBILL_NU_DOPDSP	17		WAYBILL NUMBER USED BY THE CARRIER TO MOVE THE ASSET UNDER FROM A HUB TO THE DOP/DSP.

RECORD CONTENT SHEET (RCS)
FOR
INVENTORY CONTROL POINTS TAPE

RECORD POSITION	FIELD NAME	CHAR V	CHAR F	DESCRIPTION
[illegible]-286	DT_AVAIL_[illegible]		4	DATE ATAC CONTRACTOR [illegible] THE ASSET AVAILABLE TO THE CARRIER AT THE HUB; [illegible] DATE
287-290	DT_SHIP_CARRIER		4	DATE THE TRANSSHIPMENT CARRIER PICKED UP THE ASSET FROM THE HUB FOR MOVEMENT TO THE DOP/DSP. THIS IS THE CARRIER PROVIDED DATE.
291-296	DOPDSP_UIC	6		SERVICE DESIGNATOR AND UNIT IDENTIFICATION CODE (UIC) OF THE DOP/DSP THE ASSET WAS SHIPPED TO.
297-300	DT_AVAIL_[illegible]		4	DATE DELIVERY OF THE ASSET WAS MADE AVAILABLE TO THE DOP/DSP.
301-304	DT_ARRIVE_DOPDSP		4	DATE CARRIER DELIVERED ASSET TO DOP/DSP. (THIS IS THE POD DATE.)
305-324	SIGNATURE_DOPDSP	20		SIGNATURE OF DOP/DSP EMPLOYEE THAT RECEIVES THE ASSET FROM THE CARRIER.
325-328	TAC	4		TRANSPORTATION ACCOUNT CODE
329-[illegible]	EXCEPTION_[illegible]	[illegible]		EXCEPTION CODE [illegible] ATAC CONTRACTOR. THIS EXCEPTION CODE INDICATES THAT THE [illegible] IS HAZARDOUS, CLASSIFIED, ETC.
[illegible]-334	DT_TOVR_[illegible]		4	DATE RETURNED/TURNED OVER TO HUB GOVERNMENT CO-LOCATED ACTIVITY. THIS IS THE DATE THE HUB ATAC CONTRACTOR GIVES THE ASSET TO THE CO-LOCATED ACTIVITY BECAUSE THE ASSET IS NOT HANDLED BY THE ATAC SYSTEM.
[illegible]	SIGN_[illegible]	20		SIGNATURE OF HUB'S ATAC CONTRACTOR'S PERSON RECEIVING THE ASSET BACK FROM THE CO-LOCATED GOVERNMENT ACTIVITY.
[illegible]	[illegible]		4	DATE HUB'S ATAC CONTRACTOR RECEIVED THE ASSET BACK FROM THE GOVERNMENT [illegible]
[illegible]-366	REMARKS_HUB	[illegible]		CARRIER'S REMARKS CONCERNING THIS SHIPMENT FROM A HUB TO A DOP/DSP.
367-371	BLDG_NO_SHIP	5		BUILDING NUMBER OF DELIVERY UNDER THE ADVANCED SHIPPING PROGRAM.
372-375	DTSTOW_DISPOSE		4	DATE RECORD ESTABLISHED ON THE NAVAL SUPPLY CENTER'S CARCASS TRACKING FILE FOR THIS ASSET THAT WENT TO STOW OR WAS SENT TO DISPOSAL. IF THE ASSET WENT TO STOW, THE FIELD MODE_SHIP_DOPDSP WILL HAVE AN ASTERISK (*) IN IT AND THE FIELD SIGNATURE_DEST WILL HAVE THE WORD 'STORED' IN IT. IF THE ASSET WAS SENT TO DISPOSAL, THE FIELD MODE_SHIP_DOPDSP WILL HAVE A POUND SIGN (#) IN IT AND THE FIELD SIGNATURE_DEST WILL HAVE THE WORD 'DISPOSAL' IN IT.

RECORD CONTENT SHEET (RCS)
FOR
INVENTORY CONTROL POINTS TAPE

RECORD POSITION	FIELD NAME	CHAR SIZE	DESCRIPTION
376	DRAPE_IN_INPUT	1	INDICATES THAT THE DT_RECV_[illegible] (DATE ASSET RECEIVED BACK FROM GOVERNMENT HUB PERSONNEL [illegible] SCREENING) WAS NOT INPUT FROM A DRAPE CUSTODY TRANSFER LOAN [illegible] DATA WAS MANUALLY INPUT FROM AN ATAC CONTRACTOR MICRO-COMPUT
377	DRAPE_OUT_[illegible]	1	INDICATES THAT THE DT_REC[illegible] (DATE ASSET RECEIVED BACK FROM GOVERNMENT HUB [illegible] AFTER SCREENING) WAS INPUT FROM A DRAPE CUSTODY TRANSF[illegible]
378	[illegible]	1	FROM DOP TO USE[illegible]. TO BE USED IN THE FUTURE.
379-390	CARRIER_[illegible]	[illegible]	CARRIER'S NA[illegible]. TO BE USED IN THE FUTURE.
391-407	WAYBILL_DEST	17	WAYBILL NUMBER USED BY CARRIER TO MOVE THE ASSET FROM THE DOP TO USER/DSP. TO BE USED IN THE FUTURE.
[illegible]-411	[illegible]_DEST	[illegible]	TRANSPORTATION ACCOUNT [illegible]. TO BE USED IN THE FUTURE.
412-41[illegible]	DT_[illegible]_DEST	4	DATE CARRIER PICKED UP THE [illegible] AT THE DOP. TO BE USED IN THE FUTURE.
416-[illegible]	CARRIER_COST_DEST	[illegible]	COST OF TRANSPORTATION FROM THE DOP TO THE USER/DSP. TO BE USED IN THE FUTURE.
[illegible]	DT_[illegible]	4	DATE ASSET DELIVERED TO USER/[illegible]. TO BE USED IN THE FUTURE.
[illegible]	SIGNATURE_[illegible]	[illegible]	SIGNATURE OF PERSON [illegible] AT THE DOP/DSP. [illegible] ASSET DOES NOT COME [illegible] BACK TO THE ATAC CONTRACTOR AND IT GOES TO [illegible] DISPOSAL, THE WORD "[illegible]" OR "DISPOSAL" WILL APPEAR IN [illegible] FIELD.
[illegible]-452	REMARKS_DEST	[illegible]	CARRIER'S REMARKS CONCERNING THIS SHIPMENT FROM A DOP TO DSP OR END USER. TO BE USED IN THE FUTURE.
453-472	HIGH_[illegible]ACTY_[illegible]	20	SIGNATURE OF HUB'S GOVERNMENT PERSON RECEIVING THE ASSET.
473-476	DOC_DT	4	DATE IN BLOCK 'O' OF THE 1348-1; IF NO DATE IN THIS BLOCK, THE PROGRAM USES THE JULIAN DATE OF THE DOCUMENT (RP 007-010).
477-483	PALLET_NO	7	NUMBER ASSIGNED BY THE ATAC CONTRACTOR TO THE PALLET THAT THIS ASSET WAS ON WHEN TURNED OVER TO THE GOVERNMENT HUB PERSONNEL FOR SCREENING.

RECORD CONTENT SHEET (RCS)
FOR
INVENTORY CONTROL POINTS TAPE

[illegible]	FIELD NAME	CHAR	DESCRIPTION
[illegible]	[illegible]	[illegible]	[illegible] READY TO HAND [illegible] TO THE [illegible] GOVERNMENT [illegible] FOR [illegible]ING.
[illegible]-491	[illegible]	[illegible]	DATE/TIME THE RECORD WAS CREATED. POSITIONS 488-491 = JULIAN DATE, 492-493 = HOUR, 494-495 = MINUTE, AND 496-497 = SECOND.
[illegible]	BILLCODE	1	[illegible] = [illegible], [illegible] = [illegible]
[illegible]	BILL[illegible]	6	SERVICE DESIGNATOR AND UNIT IDENTIFICATION CODE (UIC) OF THE PICKUP POINT.
[illegible]-[illegible]1	[illegible]LEADTCN	17	LEAD TRANSPORTATION CONTROL NUMBER UNDER WHICH THE SHIPMENT TRAVELED.
[illegible]	BILLDATE	4	DATE THE CARRIER PICKED UP THE SHIPMENT.
[illegible]	BILLDEST	6	SERVICE DESIGNATOR AND UNIT IDENTIFICATION CODE (UIC) OF THE SHIPMENT'S DESTINATION.
[illegible]	[illegible]	[illegible]	WAYBILL NUMBER UNDER WHICH THE SHIPMENT TRAVELED.
[illegible]	[illegible]	[illegible]	GOVERNMENT BILL OF LADING NUMBER FOR THE SHIPMENT.
557-560	BILL_PCS	4	NUMBER OF CONSOLIDATED PIECES IN THE SHIPMENT.
561-[illegible]	BILL_WGT	[illegible]	WEIGHT OF THE CONSOLIDATED SHIPMENT.
[illegible]	BILL_[illegible]	[illegible]	CUBE OF THE CONSOLIDATED SHIPMENT.
[redacted]		[illegible]	COST OF MOVEMENT TO THE DESTINATION FOR THE SHIPMENT. [illegible]
[illegible]	BILL_STAT	[illegible]	C = COMPLETE [illegible]
579	BILLCODE	1	[illegible] = [illegible]; [illegible] = [illegible]
580-585	BILLUIC	6	SERVICE DESIGNATOR AND UNIT IDENTIFICATION CODE (UIC) OF THE PICKUP POINT.
586-602	BILEADTCN	17	LEAD TRANSPORTATION CONTROL NUMBER UNDER WHICH THE SHIPMENT TRAVELED.
603-606	BILLDATE	4	DATE THE CARRIER PICKED UP THE SHIPMENT.

RECORD CONTENT SHEET (RCS)
FOR
INVENTORY CONTROL POINTS TAPE

POSITION	FIELD LEGEND	CHAR A/N	N	DESCRIPTION
[illegible]	[illegible]	[illegible]		[illegible] DESIGNATOR AND [illegible] OF THE SHIPMENT'S DESTINATION.
[illegible]	WAYBILL	7		WAYBILL NUMBER UNDER WHICH THE SHIPMENT TRAVELED.
630-637	GBL	8		GOVERNMENT BILL OF LADING NUMBER FOR THE SHIPMENT.
638-641	BILL_PCS		4	NUMBER OF CONSOLIDATED PIECES IN THE SHIPMENT.
[illegible]	BILL_WGT		4	WEIGHT OF THE CONSOLIDATED SHIPMENT.
[illegible]	BILL_CUBE		[illegible]	CUBE OF THE CONSOLIDATED [illegible]
650-658	BILL_COST		9	COST OF MOVEMENT TO THE [illegible] SHIPMENT.
659	BILL_STAT	1		C = COMPLETE
[illegible]	CURRENT_KEY	15		CURRENT DOCUMENT NUMBER [illegible]
[illegible]	[illegible]	13		CURRENT NATIONAL STOCK [illegible] WITH THIS RECORD/ASSET.
688-700	FIRST_NSN_KEY	13		FIRST PREVIOUS NATIONAL STOCK NUMBER ASSOCIATED WITH THIS RECORD/ASSET BEFORE THE CURRENT NATIONAL STOCK NUMBER.
701-713	SECOND_NSN_KEY	13		SECOND PREVIOUS NATIONAL STOCK [illegible] WITH THIS RECORD/ASSET BEFORE THE CURRENT NATIONAL STOCK NUMBER.
[illegible]	THIRD_NSN_KEY	[illegible]		THIRD PREVIOUS NATIONAL STOCK [illegible] RECORD/ASSET BEFORE THE CURRENT [illegible]
[illegible]	[illegible]	[illegible]		CURRENT DOCUMENT [illegible]
[illegible]	FIRST_DOC	[illegible]		FIRST PREVIOUS DOCUMENT [illegible] WITH THIS RECORD/ASSET BEFORE THE CURRENT DOCUMENT NUMBER.
757-771	SECOND_DOC	15		SECOND PREVIOUS DOCUMENT NUMBER ASSOCIATED WITH THIS RECORD/ASSET BEFORE THE CURRENT DOCUMENT NUMBER.
772-786	THIRD_DOC	15		THIRD PREVIOUS DOCUMENT NUMBER ASSOCIATED WITH THIS RECORD/ASSET BEFORE THE CURRENT DOCUMENT NUMBER.

APPENDIX B

Table 1B defines units of measure used in Appendix B and Appendix C.

TABLE 1B

Time :	days
Weight:	pounds
Hold :	days
Cube :	cubic feet
Report Period:	julian dates

UNCLASSIFIED MAR 91
MONTHLY ATAC HUB PERFORMANCE (M6)

FILENAME ATCRMR06 PREPARED 21 APR 91
REPORTING PERIOD 1060 THROUGH 1090

	NORFOLK	SAN DIEGO
1. NO.OF DLR'S RECEIVED FROM ATAC AGENT	33360	18323
2. NO. OF DLR'S RETURNED TO ATAC AGENT	30806	18780
3. AVERAGE SCREEN TIME FOR DLR'S MOVING TO DOP/DSP	3	5
4. AVERAGE SCREEN TIME FOR DLR'S STOWED/DISPOSED	2	5

MONTHLY ATAC HUB PERFORMANCE (M6) APR 91

FILENAME ATCRMR06 PREPARED 21 MAY 91
REPORTING PERIOD 1091 THROUGH 1120

	NORFOLK	SAN DIEGO
1. NO.OF DLR'S RECEIVED FROM ATAC AGENT	32529	19733
2. NO. OF DLR'S RETURNED TO ATAC AGENT	24125	17926
3. AVERAGE SCREEN TIME FOR DLR'S MOVING TO DOP/DSP	3	6
4. AVERAGE SCREEN TIME FOR DLR'S STOWED/DISPOSED	2	3

MONTHLY ATAC HUB PERFORMANCE (M6)

FILENAME ATCRMR06 PREPARED 21 JUN 91
REPORTING PERIOD 1121 THROUGH 1151

	NORFOLK	SAN DIEGO
1. NO.OF DLR'S RECEIVED FROM ATAC AGENT	17792	21125
2. NO. OF DLR'S RETURNED TO ATAC AGENT	24133	17495
3. AVERAGE SCREEN TIME FOR DLR'S MOVING TO DOP/DSP	3	4
4. AVERAGE SCREEN TIME FOR DLR'S STOWED/DISPOSED	2	3

MONTHLY ATAC HUB PERFORMANCE (M6) JUN 91

FILENAME ATCRMR06 PREPARED 23 JUL 91
REPORTING PERIOD 1152 THROUGH 11181

		NORFOLK	SAN DIEGO
1.	NO.OF DLR'S RECEIVED FROM ATAC AGENT	26349	19526
2.	NO. OF DLR'S RETURNED TO ATAC AGENT	22228	16486
3.	AVERAGE SCREEN TIME FOR DLR'S MOVING TO DOP/DSP	3	9
4.	AVERAGE SCREEN TIME FOR DLR'S STOWED/DISPOSED	2	3

UNCLASSIFIED JUL 91
MONTHLY ATAC HUB PERFORMANCE (M6)

FILENAME ATCRMR06 PREPARED 17 AUG 91
REPORTING PERIOD 1182 THROUGH 1212

		NORFOLK	SAN DIEGO
1.	NO.OF DLR'S RECEIVED FROM ATAC AGENT	22974	20276
2.	NO. OF DLR'S RETURNED TO ATAC AGENT	19030	18402
3.	AVERAGE SCREEN TIME FOR DLR'S MOVING TO DOP/DSP	3	4
4.	AVERAGE SCREEN TIME FOR DLR'S STOWED/DISPOSED	3	3

UNCLASSIFIED

MONTHLY ATAC HUB PERFORMANCE (M6) AUG 91

FILENAME ATCRMR06 PREPARED 14 SEP 91

REPORTING PERIOD 1213 THROUGH 1243

		NORFOLK	SAN DIEGO
1.	NO.OF DLR'S RECEIVED FROM ATAC AGENT	25928	23066
2.	NO. OF DLR'S RETURNED TO ATAC AGENT	21713	15796
3.	AVERAGE SCREEN TIME FOR DLR'S MOVING TO DOP/DSP	3	4
4.	AVERAGE SCREEN TIME FOR DLR'S STOWED/DISPOSED	2	4

UNCLASSIFIED MAR 91

MONTHLY EAST COAST CONUS NODE PERFORMANCE (M6A)

ATCRMR07 PREPARED 21 APR 91

REPORTING PERIOD 1060 THROUGH 1090

		CHA	JAX	PEN	COR
1.	NO. OF DLR'S PROCESSED	1522	2674	530	1110
2.	AVERAGE RECEIPT WEIGHT OF DLR	31	33	16	38
3.	AVERAGE RECEIPT CUBE OF DLR	2	3	2	3
6.	AVERAGE TRANSIT TIME TO HUB	7	2	2	2

UNCLASSIFIED APR 91

MONTHLY EAST COAST CONUS NODE PERFORMANCE (M6A)

ATCRMR07 PREPARED 21 MAY 91

REPORTING PERIOD 1091 THROUGH 1120

	CHA	JAX	PEN	COR
1. NO. OF DLR'S PROCESSED	1374	3189	521	1191
2. AVERAGE RECEIPT WEIGHT OF DLR	30	33	17	38
3. AVERAGE RECEIPT CUBE OF DLR	1	3	2	3
6. AVERAGE TRANSIT TIME TO HUB	1	1	2	2

UNCLASSIFIED MAY 91

MONTHLY EAST COAST CONUS NODE PERFORMANCE (M6A)

ATCRMR07 PREPARED 19 JUN 91

REPORTING PERIOD 1121 THROUGH 1151

	CHA	JAX	PEN	COR
1. NO. OF DLR'S PROCESSED	1433	3295	429	1031
2. AVERAGE RECEIPT WEIGHT OF DLR	40	33	14	41
3. AVERAGE RECEIPT CUBE OF DLR	2	3	2	4
6. AVERAGE TRANSIT TIME TO HUB	1	1	1	1

MONTHLY EAST COAST CONUS NODE PERFORMANCE (M6A)

ATCRMRO7 PREPARED 23 JUL 91

REPORTING PERIOD 1152 THROUGH 1181

	CHA	JAX	PEN	COR
1. NO. OF DLR'S PROCESSED	1283	2790	401	958
2. AVERAGE RECEIPT WEIGHT OF DLR	22	34	13	31
3. AVERAGE RECEIPT CUBE OF DLR	1	3	1	3
6. AVERAGE TRANSIT TIME TO HUB	1	1	2	2

MONTHLY EAST COAST CONUS NODE PERFORMANCE (M6A)

ATCRMRO7 PREPARED 17 AUG 91

REPORTING PERIOD 1182 THROUGH 1212

	CHA	JAX	PEN	COR
1. NO. OF DLR'S PROCESSED	1115	2603	403	842
2. AVERAGE RECEIPT WEIGHT OF DLR	36	35	17	43
3. AVERAGE RECEIPT CUBE OF DLR	2	3	2	4
6. AVERAGE TRANSIT TIME TO HUB	1	1	2	7

MONTHLY EAST COAST CONUS NODE PERFORMANCE (M6A)

ATCRMRO7 PREPARED 14 SEP 91

REPORTING PERIOD 1213 THROUGH 1243

	CHA	JAX	PEN	COR
1. NO. OF DLR'S PROCESSED	1046	3376	392	1162
2. AVERAGE RECEIPT WEIGHT OF DLR	29	48	22	34
3. AVERAGE RECEIPT CUBE OF DLR	1	3	2	3
6. AVERAGE TRANSIT TIME TO HUB	2	1	2	2

MONTHLY WEST COAST CONUS NODE PERFORMANCE (M6B)

ATCRMR08 PREPARED 21 APR 91

REPORTING PERIOD 1060 THROUGH 1090

	BRE	OAK	LGB
1. NO. OF DLR'S PROCESSED	1778	1144	1479
2. AVERAGE RECEIPT WEIGHT OF DLR	33	31	37
3. AVERAGE RECEIPT CUBE OF DLR	2	2	3
6. AVERAGE TRANSIT TIME TO HUB	2	2	1

UNCLASSIFIED APR 91

MONTHLY WEST COAST CONUS NODE PERFORMANCE (M6B)

ATCRMRO8 PREPARED 25 MAY 91

REPORTING PERIOD 1091 THROUGH 1120

		BRE	OAK	LGB
1.	NO. OF DLR'S PROCESSED	1651	1193	1659
2.	AVERAGE RECEIPT WEIGHT OF DLR	40	32	35
3.	AVERAGE RECEIPT CUBE OF DLR	3	3	3
6.	AVERAGE TRANSIT TIME TO HUB	7	2	1

UNCLASSIFIED MAY 91

MONTHLY WEST COAST CONUS NODE PERFORMANCE (M6B)

ATCRMRO8 PREPARED 19 JUN 91

REPORTING PERIOD 1121 THROUGH 1151

		BRE	OAK	LGB
1.	NO. OF DLR'S PROCESSED	1576	1699	1659
2.	AVERAGE RECEIPT WEIGHT OF DLR	33	34	45
3.	AVERAGE RECEIPT CUBE OF DLR	3	2	4
6.	AVERAGE TRANSIT TIME TO HUB	2	3	1

MONTHLY WEST COAST CONUS NODE PERFORMANCE (M6B)

ATCRMR08 PREPARED 23 JUL 91

REPORTING PERIOD 1152 THROUGH 1181

		BRE	OAK	LGB
1.	NO. OF DLR'S PROCESSED	1270	1264	1731
2.	AVERAGE RECEIPT WEIGHT OF DLR	34	25	31
3.	AVERAGE RECEIPT CUBE OF DLR	3	2	3
6.	AVERAGE TRANSIT TIME TO HUB	2	4	1

MONTHLY WEST COAST CONUS NODE PERFORMANCE (M6B)

ATCRMRO8 PREPARED 17 AUG 91

REPORTING PERIOD 1182 THROUGH 1212

	BRE	OAK	LGB
1. NO. OF DLR'S PROCESSED	1671	1048	2250
2. AVERAGE RECEIPT WEIGHT OF DLR	48	26	39
3. AVERAGE RECEIPT CUBE OF DLR	2	2	3
6. AVERAGE TRANSIT TIME TO HUB	2	2	1

MONTHLY WEST COAST CONUS NODE PERFORMANCE (M6B)

ATCRMRO8 PREPARED 14 SEP 91

REPORTING PERIOD 1213 THROUGH 1243

		BRE	OAK	LGB
1.	NO. OF DLR'S PROCESSED	1859	1074	2222
2.	AVERAGE RECEIPT WEIGHT OF DLR	28	18	43
3.	AVERAGE RECEIPT CUBE OF DLR	4	1	4
6.	AVERAGE TRANSIT TIME TO HUB	2	2	4

MONTHLY OVERSEAS NODE PERFORMANCE (M6C)

ATCRMRO9 PREPARED 21 APR 91

REPORTING PERIOD 1060 THROUGH 1090

		SIG	PRL	YOK
1.	NO. OF DLR'S PROCESSED	2240	1366	468
2.	AVERAGE RECEIPT WEIGHT OF DLR	33	24	46
3.	AVERAGE RECEIPT CUBE OF DLR	8	2	2
8.	AVERAGE MAC TRANSIT TIME AND DELIVERY TIME TO HUB	4	2	2

MONTHLY OVERSEAS NODE PERFORMANCE (M6C)

ATCRMRO9 PREPARED 22 MAY 91

REPORTING PERIOD 1091 THROUGH 1120

		SIG	PRL	YOK
1.	NO. OF DLR'S PROCESSED	1515	1859	579
2.	AVERAGE RECEIPT WEIGHT OF DLR	43	26	35
3.	AVERAGE RECEIPT CUBE OF DLR	4	3	2
8.	AVERAGE MAC TRANSIT TIME AND DELIVERY TIME TO HUB	5	1	3

MONTHLY OVERSEAS NODE PERFORMANCE (M6C)

ATCRMRO9 PREPARED 19 JUN 91

REPORTING PERIOD 1121 THROUGH 1151

		SIG	PRL	YOK
1.	NO. OF DLR'S PROCESSED	1514	1649	608
2.	AVERAGE RECEIPT WEIGHT OF DLR	31	26	29
3.	AVERAGE RECEIPT CUBE OF DLR	4	2	2
8.	AVERAGE MAC TRANSIT TIME AND DELIVERY TIME TO HUB	1	3	3

MONTHLY OVERSEAS NODE PERFORMANCE (M6C)

ATCRMRO9 PREPARED 23 JUL 91

REPORTING PERIOD 1152 THROUGH 1181

		SIG	PRL	YOK
1.	NO. OF DLR'S PROCESSED	1235	1962	568
2.	AVERAGE RECEIPT WEIGHT OF DLR	47	31	25
3.	AVERAGE RECEIPT CUBE OF DLR	4	2	2
8.	AVERAGE MAC TRANSIT TIME AND DELIVERY TIME TO HUB	3	2	3

MONTHLY OVERSEAS NODE PERFORMANCE (M6C)

ATCRMRO9 PREPARED 17 AUG 91

REPORTING PERIOD 1182 THROUGH 1212

	SIG	PRL	YOK
1. NO. OF DLR'S PROCESSED	846	1861	726
2. AVERAGE RECEIPT WEIGHT OF DLR	102	27	40
3. AVERAGE RECEIPT CUBE OF DLR	9	8	3
8. AVERAGE MAC TRANSIT TIME AND DELIVERY TIME TO HUB	2	3	4

MONTHLY OVERSEAS NODE PERFORMANCE (M6C)

ATCRMR09 PREPARED 14 SEP 91

REPORTING PERIOD 1213 THROUGH 1243

	SIG	PRL	YOK
1. NO. OF DLR'S PROCESSED	919	1657	642
2. AVERAGE RECEIPT WEIGHT OF DLR	58	34	28
3. AVERAGE RECEIPT CUBE OF DLR	5	3	2
8. AVERAGE MAC TRANSIT TIME AND DELIVERY TIME TO HUB	2	2	3

MONTHLY OVERSEAS NODE PERFORMANCE (M6D)

ATCRMR10 PREPARED 21 APR 91

REPORTING PERIOD 1060 THROUGH 1090

		SUBIC BAY
1.	NO. OF DLR'S RECEIVED	3933
2.	AVERAGE RECEIPT WEIGHT OF FREE FLOW DLR	32
3.	AVERAGE RECEIPT CUBE OF FREE FLOW DLR	3
5.	AVERAGE PROCESSING DAYS AT HUB	8
6.	AVERAGE TRANSIT DAYS TO SAN DIEGO	0

MONTHLY OVERSEAS NODE PERFORMANCE (M6D)

ATCRMR10 PREPARED 18 MAY 91

REPORTING PERIOD 1091 THROUGH 1120

		SUBIC BAY
1.	NO. OF DLR'S RECEIVED	3244
2.	AVERAGE RECEIPT WEIGHT OF FREE FLOW DLR	22
3.	AVERAGE RECEIPT CUBE OF FREE FLOW DLR	2
5.	AVERAGE PROCESSING DAYS AT HUB	8
6.	AVERAGE TRANSIT DAYS TO SAN DIEGO	91

MONTHLY OVERSEAS NODE PERFORMANCE (M6D)

ATCRMR10 PREPARED 20 JUN 91

REPORTING PERIOD 1121 THROUGH 1151

		SUBIC BAY
1.	NO. OF DLR'S RECEIVED	3118
2.	AVERAGE RECEIPT WEIGHT OF FREE FLOW DLR	38
3.	AVERAGE RECEIPT CUBE OF FREE FLOW DLR	4
5.	AVERAGE PROCESSING DAYS AT HUB	7
6.	AVERAGE TRANSIT DAYS TO SAN DIEGO	24

MONTHLY OVERSEAS NODE PERFORMANCE (M6D)

ATCRMR10 PREPARED 23 JUL 91

REPORTING PERIOD 1152 THROUGH 1181

		SUBIC BAY
1.	NO. OF DLR'S RECEIVED	693
2.	AVERAGE RECEIPT WEIGHT OF FREE FLOW DLR	27
3.	AVERAGE RECEIPT CUBE OF FREE FLOW DLR	2
5.	AVERAGE PROCESSING DAYS AT HUB	0
6.	AVERAGE TRANSIT DAYS TO SAN DIEGO	36

MONTHLY OVERSEAS NODE PERFORMANCE (M6D)

ATCRMR10 PREPARED 17 AUG 91

REPORTING PERIOD 1182 THROUGH 1212

		SUBIC BAY
1.	NO. OF DLR'S RECEIVED	1462
2.	AVERAGE RECEIPT WEIGHT OF FREE FLOW DLR	19
3.	AVERAGE RECEIPT CUBE OF FREE FLOW DLR	2
5.	AVERAGE PROCESSING DAYS AT HUB	14
6.	AVERAGE TRANSIT DAYS TO SAN DIEGO	10

MONTHLY OVERSEAS NODE PERFORMANCE (M6D)

ATCRMR10 PREPARED 14 SEP 91

REPORTING PERIOD 1213 THROUGH 1243

		SUBIC BAY
1.	NO. OF DLR'S RECEIVED	2403
2.	AVERAGE RECEIPT WEIGHT OF FREE FLOW DLR	37
3.	AVERAGE RECEIPT CUBE OF FREE FLOW DLR	3
5.	AVERAGE PROCESSING DAYS AT HUB	22
6.	AVERAGE TRANSIT DAYS TO SAN DIEGO	6

MONTHLY CONUS HUB PERFORMANCE (M6E)

ATCRMR11 PREPARED 24 APR 91

REPORTING PERIOD 1060 THROUGH 1090

		NOR	SAN	CHPT
1.	NO. OF FREE FLOW DLR'S	26192	12292	1230
2.	TOTAL NO. OF DLR'S REC'D	35099	18420	1231
3.	AVG RECEIPT WEIGHT OF FREE FLOW DLR'S	43	42	50
4.	AVG RECEIPT CUBE OF FREE FLOW DLR'S	4	4	4
5.	AVG TRANSIT TIME FROM ORIGIN TO AGENT AT HUB FOR FREE FLOW DLR'S	14	19	0
6.	AVG HOLD BEFORE OFF-LOAD	1	1	0
7.	AVG AGENT OFF-LOAD TO TURN-OVER	2	1	0
8.	AVG GOV'T SCREEN TIME	3	3	0
9.	AVG AGENT TRANSHIP HOLD TIME	1	1	1
10.	AVG TRANSIT TIME TO DOP/DSP BY MODE:			
	MODE T:	3	3	3
	MODE U:	2	4	0
	MODE 9:	1	0	0
11.	NO. DLR'S SHIPPED:			
	MODE T:	10322	9865	899
	MODE U:	7556	2	0
	MODE 9:	281	6	0
	TOTAL:	18169	9873	899
12.	NO. DLR'S TO STOW	9975	6371	313

MONTHLY CONUS HUB PERFORMANCE (M6E)

ATCRMR11 PREPARED 30 MAY 91

REPORTING PERIOD 1091 THROUGH 1120

		NOR	SAN	CHPT
1.	NO. OF FREE FLOW DLR'S	21174	13146	1270
2.	TOTAL NO. OF DLR'S REC'D	29286	19993	1272
3.	AVG RECEIPT WEIGHT OF FREE FLOW DLR'S	46	41	55
4.	AVG RECEIPT CUBE OF FREE FLOW DLR'S	4	6	9
5.	AVG TRANSIT TIME FROM ORIGIN TO AGENT AT HUB FOR FREE FLOW DLR'S	11	10	0
6.	AVG HOLD BEFORE OFF-LOAD	1	1	0
7.	AVG AGENT OFF-LOAD TO TURN-OVER	1	1	0
8.	AVG GOV'T SCREEN TIME	3	6	0
9.	AVG AGENT TRANSHIP HOLD TIME	1	1	1
10.	AVG TRANSIT TIME TO DOP/DSP BY MODE:			
	MODE T:	2	3	3
	MODE U:	2	0	0
	MODE 9:	1	1	0
11.	NO. DLR'S SHIPPED:			
	MODE T:	10446	12922	913
	MODE U:	7559	4	0
	MODE 9:	214	187	0
	TOTAL:	18219	13173	913
12.	NO. DLR'S TO STOW	8942	7307	342

MONTHLY CONUS HUB PERFORMANCE (M6E)

ATCRMR11 PREPARED 20 JUN 91

REPORTING PERIOD 1121 THROUGH 1151

		NOR	SAN	CHPT
1.	NO. OF FREE FLOW DLR'S	21213	13971	1513
2.	TOTAL NO. OF DLR'S REC'D	28494	20976	1514
3.	AVG RECEIPT WEIGHT OF FREE FLOW DLR'S	54	38	63
4.	AVG RECEIPT CUBE OF FREE FLOW DLR'S	5	4	6
5.	AVG TRANSIT TIME FROM ORIGIN TO AGENT AT HUB FOR FREE FLOW DLR'S	11	9	0
6.	AVG HOLD BEFORE OFF-LOAD	1	1	0
7.	AVG AGENT OFF-LOAD TO TURN-OVER	1	1	0
8.	AVG GOV'T SCREEN TIME	3	4	0
9.	AVG AGENT TRANSHIP HOLD TIME	1	1	1
10.	AVG TRANSIT TIME TO DOP/DSP BY MODE:			
	MODE T:	2	3	3
	MODE U:	2	1	0
	MODE 9:	1	1	0
11.	NO. DLR'S SHIPPED:			
	MODE T:	12032	14656	1157
	MODE U:	6278	2	0
	MODE 9:	250	382	0
	TOTAL:	18560	15040	1157
12.	NO. DLR'S TO STOW	8693	7355	329

MONTHLY CONUS HUB PERFORMANCE (M6E)

ATCRMR11 PREPARED 23 JUL 91

REPORTING PERIOD 1152 THROUGH 1181

		NOR	SAN	CHPT
1.	NO. OF FREE FLOW DLR'S	19563	13207	1540
2.	TOTAL NO. OF DLR'S REC'D	26479	19646	1540
3.	AVG RECEIPT WEIGHT OF FREE FLOW DLR'S	54	38	63
4.	AVG RECEIPT CUBE OF FREE FLOW DLR'S	4	4	6
5.	AVG TRANSIT TIME FROM ORIGIN TO AGENT AT HUB FOR FREE FLOW DLR'S	13	10	0
6.	AVG HOLD BEFORE OFF-LOAD	1	1	0
7.	AVG AGENT OFF-LOAD TO TURN-OVER	1	1	0
8.	AVG GOV'T SCREEN TIME	3	9	0
9.	AVG AGENT TRANSHIP HOLD TIME	1	1	1
10.	AVG TRANSIT TIME TO DOP/DSP BY MODE:			
	MODE T:	2	3	3
	MODE U:	2	0	0
	MODE 9:	7	1	0
11.	NO. DLR'S SHIPPED:			
	MODE T:	10051	13956	1168
	MODE U:	6866	4	0
	MODE 9:	255	324	0
	TOTAL:	17172	14284	1168
12.	NO. DLR'S TO STOW	8155	8002	342

MONTHLY CONUS HUB PERFORMANCE (M6E)

ATCRMR11 PREPARED 17 AUG 91
REPORTING PERIOD 1182 THROUGH 1212

		NOR	SAN	CHPT
1.	NO. OF FREE FLOW DLR'S	16002	12995	2001
2.	TOTAL NO. OF DLR'S REC'D	21859	20495	2001
3.	AVG RECEIPT WEIGHT OF FREE FLOW DLR'S	43	31	60
4.	AVG RECEIPT CUBE OF FREE FLOW DLR'S	3	3	5
5.	AVG TRANSIT TIME FROM ORIGIN TO AGENT AT HUB FOR FREE FLOW DLR'S	10	14	0
6.	AVG HOLD BEFORE OFF-LOAD	1	1	0
7.	AVG AGENT OFF-LOAD TO TURN-OVER	1	1	0
8.	AVG GOV'T SCREEN TIME	3	4	0
9.	AVG AGENT TRANSHIP HOLD TIME	1	1	1
10.	AVG TRANSIT TIME TO DOP/DSP BY MODE:			
	MODE T:	3	3	3
	MODE U:	1	1	0
	MODE 9:	1	1	0
11.	NO. DLR'S SHIPPED:			
	MODE T:	9788	14304	1802
	MODE U:	6267	2	0
	MODE 9:	291	312	0
	TOTAL:	16346	14618	1802
12.	NO. DLR'S TO STOW	6436	7657	342

MONTHLY CONUS HUB PERFORMANCE (M6E)

ATCRMR11 PREPARED 14 SEP 91

REPORTING PERIOD 1213 THROUGH 1243

		NOR	SAN	CHPT
1.	NO. OF FREE FLOW DLR'S	20763	15664	2243
2.	TOTAL NO. OF DLR'S REC'D	26952	23134	2244
3.	AVG RECEIPT WEIGHT OF FREE FLOW DLR'S	39	41	47
4.	AVG RECEIPT CUBE OF FREE FLOW DLR'S	3	4	4
5.	AVG TRANSIT TIME FROM ORIGIN TO AGENT AT HUB FOR FREE FLOW DLR'S	10	11	0
6.	AVG HOLD BEFORE OFF-LOAD	1	1	0
7.	AVG AGENT OFF-LOAD TO TURN-OVER	1	1	0
8.	AVG GOV'T SCREEN TIME	3	4	0
9.	AVG AGENT TRANSHIP HOLD TIME	1	1	1
10.	AVG TRANSIT TIME TO DOP/DSP BY MODE:			
	MODE T:	2	3	2
	MODE U:	1	3	0
	MODE 9:	1	1	0
11.	NO. DLR'S SHIPPED:			
	MODE T:	14142	17957	1954
	MODE U:	7191	1	0
	MODE 9:	290	312	0
	TOTAL:	21623	18578	1954
12.	NO. DLR'S TO STOW	6126	3155	250

APPENDIX C

ATAC HUB PERFORMANCE (M6)
MAR-AUG 1991

NORFOLK

	MAR	APR	MAY	JUN	JUL	AUG	AVERAGE
DLR'S RECEIVED FROM AGENT:	33360	32529	27792	26349	22974	25928	28155
DLR'S RETURNED TO AGENT:	30806	24125	24133	22228	19030	21713	23673
DIFFERENCE:	2554	8404	3659	4121	3944	4215	4483
AVG SCREEN TIME TO DOP/DSP:	3	3	3	3	3	3	3
AVG SCREEN TIME FOR STOW/DISP:	2	2	2	2	3	2	2

ATAC HUB PERFORMANCE (M6)
MAR-AUG 1991

SAN DIEGO

	MAR	APR	MAY	JUN	JUL	AUG	AVERAGE
DLR'S RECEIVED FROM AGENT:	18323	19733	21125	19526	10176	23066	18658
DLR'S RETURNED TO AGENT:	18780	17926	17495	16486	18402	15796	17481
DIFFERENCE:	-457	1807	3630	3040	-8226	7270	1177
AVG SCREEN TIME TO DOP/DSP:	5	6	4	9	4	4	5
AVG SCREEN TIME FOR STOW/DISPOSAL:	5	3	3	3	3	4	4

ATAC HUB PERFORMANCE (M6)
MAR-AUG 1991
COMBINED

	MAR	APR	MAY	JUN	JUL	AUG	AVERAGE
DLR'S RECEIVED FROM AGENT:	51683	52262	48917	45875	33150	48994	46814
DLR'S RETURNED TO AGENT:	49586	42051	41628	38714	37432	37509	41153
DIFFERENCE:	2097	10211	7289	7161	-4282	11485	5660
AVG SCREEN TIME TO DOP/DSP:	4	5	4	6	4	4	4
AVG SCREEN TIME FOR STOW/DISPOSAL:	4	3	3	3	3	3	3

ATAC HUB PERFORMANCE (M6E)
MAR-AUG 1991
NORFOLK

	MAR	APR	MAY	JUN	JUL	AUG	AVERAGE
TOTAL DLR'S REC'D:	35099	29286	28494	26479	21859	26952	28028
FREE FLOW DLR'S:	26192	21174	21213	19563	16002	20763	20818
DIFFERENCE:	8907	8112	7281	6916	5857	6189	7210
DLR'S SHIPPED TO DOP/DSP BY MODE:							
MODE T:	10332	10446	12032	10051	9788	14142	11132
MODE U:	7556	7559	6278	6866	6267	7191	6953
MODE 9:	281	214	250	255	291	290	264
TOTAL SHIPPED:	18169	18219	18560	17172	16346	21623	18348
DLR'S TO STOW:	9975	8942	8693	8155	6436	6126	8055
TOTAL PROCESSED:	28144	27161	27253	25327	22782	27749	26403

ATAC HUB PERFORMANCE (M6E)
MAR-AUG 1991

SAN DIEGO

	MAR	APR	MAY	JUN	JUL	AUG	AVERAGE
TOTAL DLR'S REC'D:	18420	19993	20976	19646	20495	23134	20444
FREE FLOW DLR'S:	12292	13146	13971	13207	12995	15664	13546
DIFFERENCE:	6128	6847	7005	6439	7500	7470	6898
DLR'S SHIPPED TO DOP/DSP BY MODE:							
MODE T:	9865	12911	14656	13956	14304	17957	13942
MODE U:	2	4	2	4	2	1	3
MODE 9:	6	187	382	324	312	620	305
TOTAL SHIPPED:	9873	13102	15040	14284	14618	18578	14249
DLR'S TO STOW:	6371	7307	7355	8002	7657	3155	6641
TOTAL PROCESSED:	16244	20409	22395	22286	22275	21733	20890

ATAC HUB PERFORMANCE (M6E)
MAR-AUG 1991

COMBINED

	MAR	APR	MAY	JUN	JUL	AUG	AVERAGE
TOTAL DLR'S REC'D:	53519	49279	49470	46125	42354	50086	48472
FREE FLOW DLR'S:	38484	34320	35184	32770	28997	36427	34364
DIFFERENCE:	15035	14959	14286	13355	13357	13659	14109
DLR'S SHIPPED TO DOP/DSP BY MODE:							
MODE T:	20197	23357	26688	24007	24092	32099	25073
MODE U:	7558	7563	6280	6870	6269	7192	6955
MODE 9:	287	401	632	579	603	910	569
TOTAL SHIPPED:	28042	31321	33600	31456	30964	40201	32597
DLR'S TO STOW:	16346	16249	16048	16157	14093	9281	14696
TOTAL PROCESSED:	44388	47570	49648	47613	45057	49482	47293

ATAC HUB PERFORMANCE (M6E)
MAR-AUG 1991

AVERAGE HUB PROCESSING

TOTAL DLR'S REC'D:	24236		
FREE FLOW DLR'S:	17182		
DIFFERENCE:	7054		
DLR'S SHIPPED TO DOP/DSP BY MODE:			
MODE T:	12537		
MODE U:	3478		
MODE 9:	284		
TOTAL SHIPPED:	16299		
DLR'S TO STOW:	7348		
		REPAIR (NAVSUP'S %)	STOW
TOTAL PROCESSED:	23647	.56	.44
ANNUAL PROCESSING:	283758	158904	124854
DLR'S PER HOUR:	142	79	62
DLR'S PER DAY:	1135	636	499
DLR'S PER WEEK:	5675	3178	2497

ATAC NODE PERFORMANCE (M6A,M6B,M6C)
EAST COAST

	CHA	JAX	PEN	COR	SIG	TOTAL	AVERAGE PER MONTH
MAR	1522	2674	530	1110	2240	8076	1615
APR	1374	3189	521	1191	1515	7790	1558
MAY	1433	3295	429	1031	1514	7702	1540
JUN	1283	2790	401	958	1235	6667	1333
JUL	1115	2603	403	842	846	5809	1162
AUG	1046	3376	392	1162	919	6895	1379
TOTAL:	7773	17927	2676	6294	8269	42939	8588
%:	18%	42%	6%	15%	19%	100%	
AVG:	1296	2988	446	1049	1378		

ATAC NODE PERFORMANCE (M6A,M6B,M6C)
WEST COAST

	BRE	OAK	LGB	PRL	YOK	TOTAL	AVERAGE PER MONTH
MAR	1778	1144	1479	1366	468	6235	2078
APR	1651	1193	1659	1859	579	6941	2314
MAY	1576	1699	1659	1649	608	7191	2397
JUN	1270	1264	1731	1962	568	6795	2265
JUL	1671	1048	2250	1861	726	7556	251
AUG	1859	1074	2222	1657	642	7454	2485
TOTAL:	9805	7422	11000	10354	3591	42172	14057
%:	23%	18%	26%	25%	9%	100%	
AVG:	1634	1237	1833	1726	599		

ATAC NODE PERFORMANCE (M6A,M6B,M6C)
MAR-AUG 1991

COMBINED

	TOTAL EAST	TOTAL WEST	AVERAGE	TOTAL COMBINED
MAR	8076	6235	7156	14311
APR	7790	6941	7366	14731
MAY	7702	7191	7447	14893
JUN	6667	6795	6731	13462
JUL	5809	7556	6683	13365
AUG	6895	7454	7175	14349
TOTAL:	42939	42172		85111
%:	50%	50%		100%

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